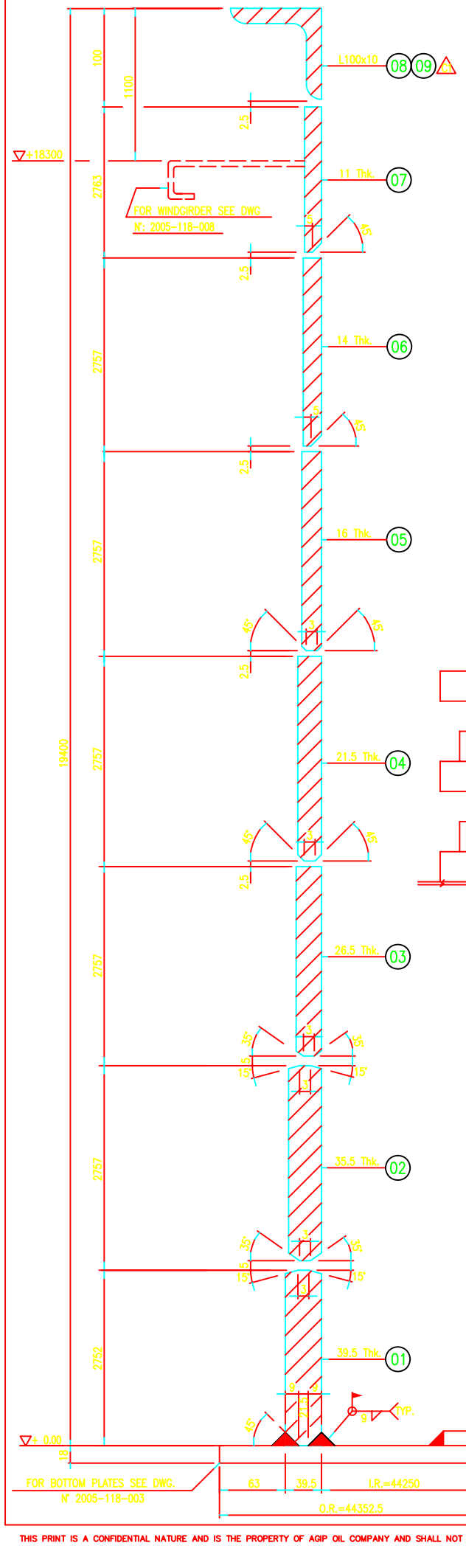
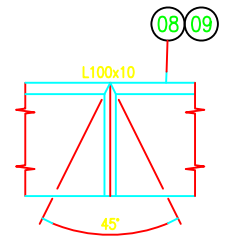
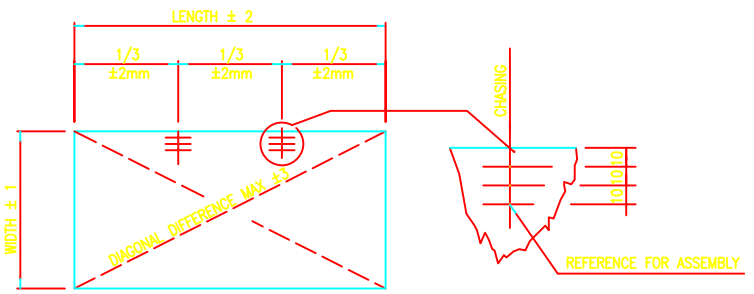
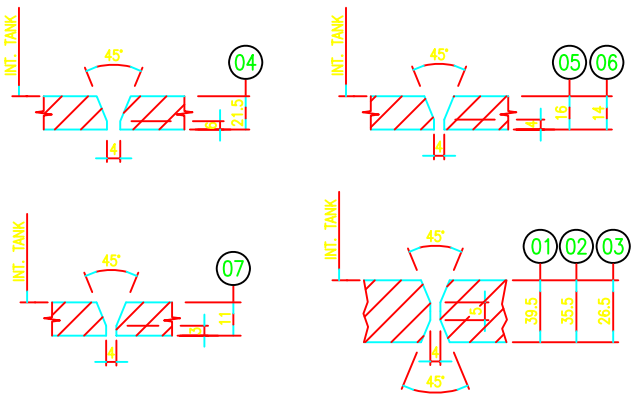




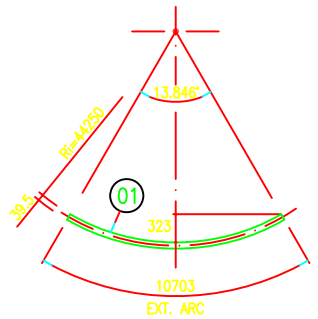
JOINT DETAIL TOP ANGLE



TOLLERANCE PLATES



VERTICAL JOINTS DETAIL



DEVELOPMENT PLATES 1st COURSE

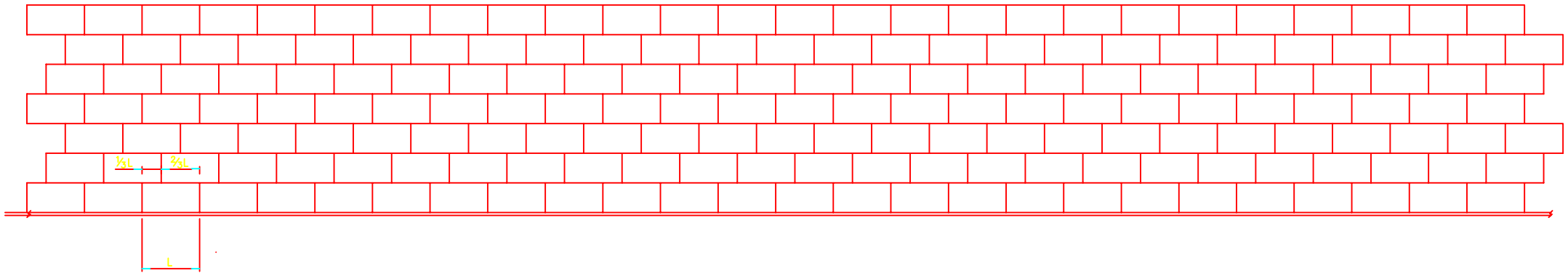
ITEM	QUANTITY	DESCRIPTION	MATERIAL	UNITARY WEIGHT	TOTAL WEIGHT	NOTE
01	26	PLATE 39.5 THK 10698 x 2752	A 573 M Gr.485 MOD	9303	241886	
02	26	PLATE 35.5 THK 10698 x 2757	A 573 M Gr.485 MOD	8376	217776	
03	26	PLATE 26.5 THK 10697 x 2757	A 573 M Gr.485 MOD	6252	162552	
04	26	PLATE 21.5 THK 10696 x 2757	A 573 M Gr.485 MOD	5072	131872	
05	26	PLATE 16 THK 10695 x 2757	A 573 M Gr.485 MOD	3774	98124	
06	26	PLATE 14 THK 10695 x 2757	A 573 M Gr.485 MOD	3302	85852	
07	26	PLATE 11 THK 10695 x 2763	A 283 M Gr.380	2600	67611	
08	23	L 100x10 L= 12000	S 275 JR EN 10025	181.2	4167.6	
09	1	L 100x10 L= 2000	S 275 JR EN 10025	30.2	30.2	

TOTAL WEIGHT Kg 1009871

FOR 'GENERAL ASSEMBLY' SEE DWG N°: 2005-118-001

NOTES:

1) ALL WELDINGS ARE CARRIED-OUT AT SITE.

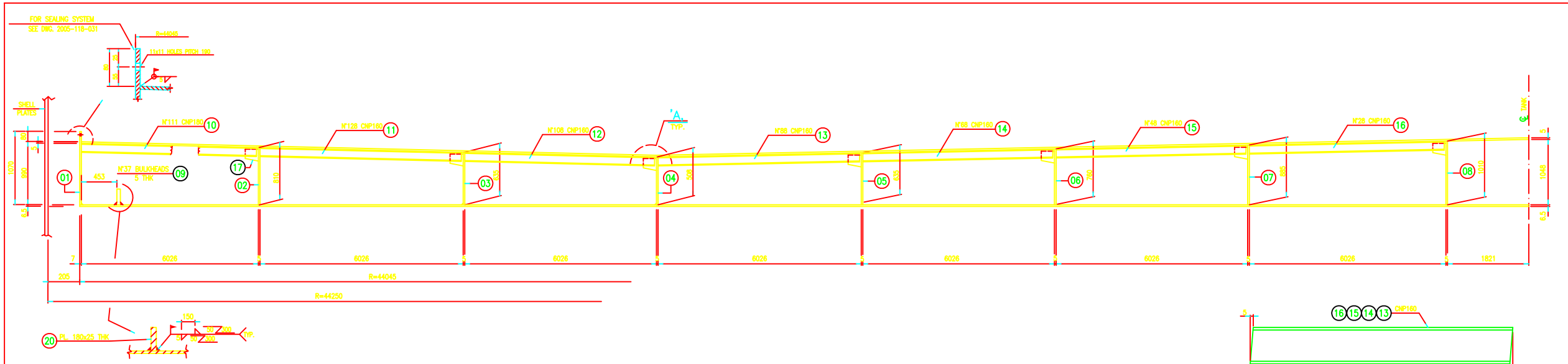


SHELL PLATES ASSEMBLY

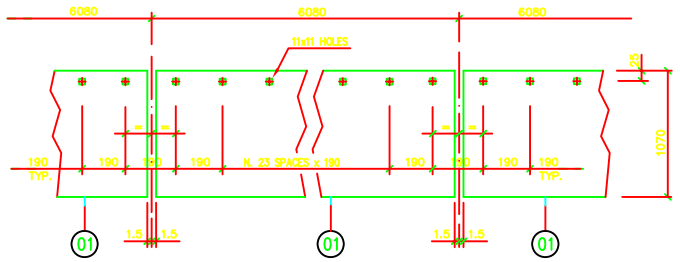
SHOP NOTE:

1ST COURSE BENDING RADIUS = Ri x 1 = 44250

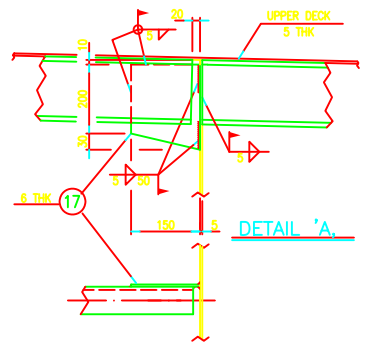
2ND TO 6TH COURSE BENDING RADIUS = Ri x 1.125 = 49781

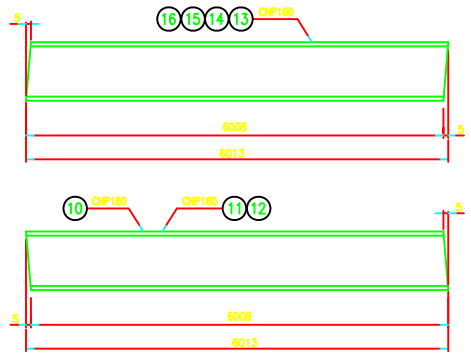


COMPRESSION PLATE (20) TO BE CUTTED AT FIELD IN CORRISPONDANCE OF STRAND WELLS AND GUIDE POLE HOLE.
FOR ORIENTATIONS SEE DWG. 2005-118-002



PLATES DEVELOPMENT EXTERNAL COURSE
N.46 PIECES
(N°45 AS SHOWN + N°1 TO BE PERFORMED ON SITE)





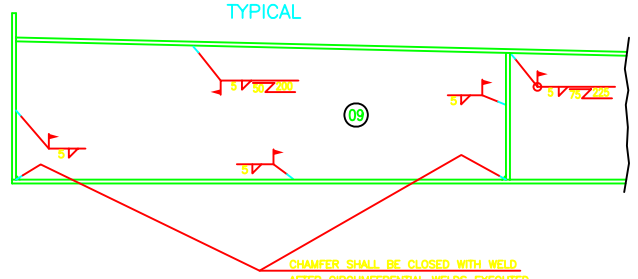
ITEM	QUANTITY	DESCRIPTION		MATERIAL	UNITARY WEIGHT	TOTAL WEIGHT	NOTE
01	46	PLATE	Thk. 7 6090x1070		364	16758	
02	1	PLATE	Thk. 5 238821x810		7737.8	7737.8	
03	1	PLATE	Thk. 5 200927x635		5103.5	5103.5	
04	1	PLATE	Thk. 5 163033x506		3312.8	3312.8	
05	1	PLATE	Thk. 5 125139x635		3178.5	3178.5	
06	1	PLATE	Thk. 5 87245x760		2652.2	2652.2	
07	1	PLATE	Thk. 5 48351x885		1747	1747	
08	1	PLATE	Thk. 5 11457x1010		462.9	462.9	
09	37	PLATE	Thk. 5 6026x985		210.4	6005	
10	111	CNP 180	L= 6013		132.3	14683.7	
11	128	CNP 160	L= 6013		113	14468.7	
12	108	CNP 160	L= 6013		113	12208.5	
13	88	CNP 160	L= 6013		113	9947.9	
14	68	CNP 160	L= 6013		113	7687	
15	48	CNP 160	L= 6013		113	5426.1	
16	28	CNP 160	L= 6013		113	3165.2	
17	579	PLATE	Thk. 6 230x150		1.5	868.3	
20	37	PLATE	Thk. 25 7399x180		286.3	2855.9	
21	46	PLATE	Thk. 5 990x50		2	92	

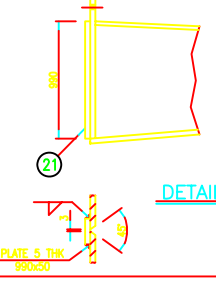
TOTAL WEIGHT Kg 127390

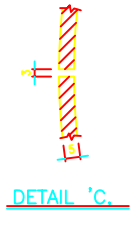
NOTES:

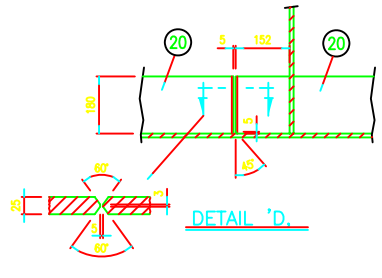
1) FOR ORIENTATION ROOF SUPPORTS SEE DWG N° 2005-118-002.
2) FOR GENERAL ASSEMBLY SEE DWG N° 2005-118-001.
3) ALL WELDS INDICATED WITH ⚑ ARE ON SITE WELDS.

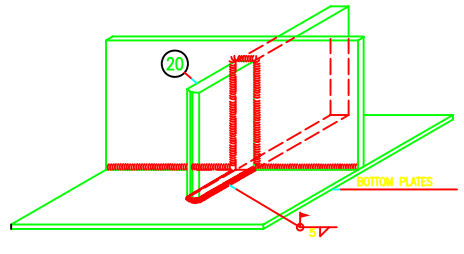
BULKHEADS WELDS DETAIL
TYPICAL

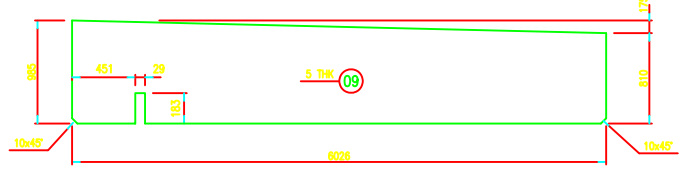




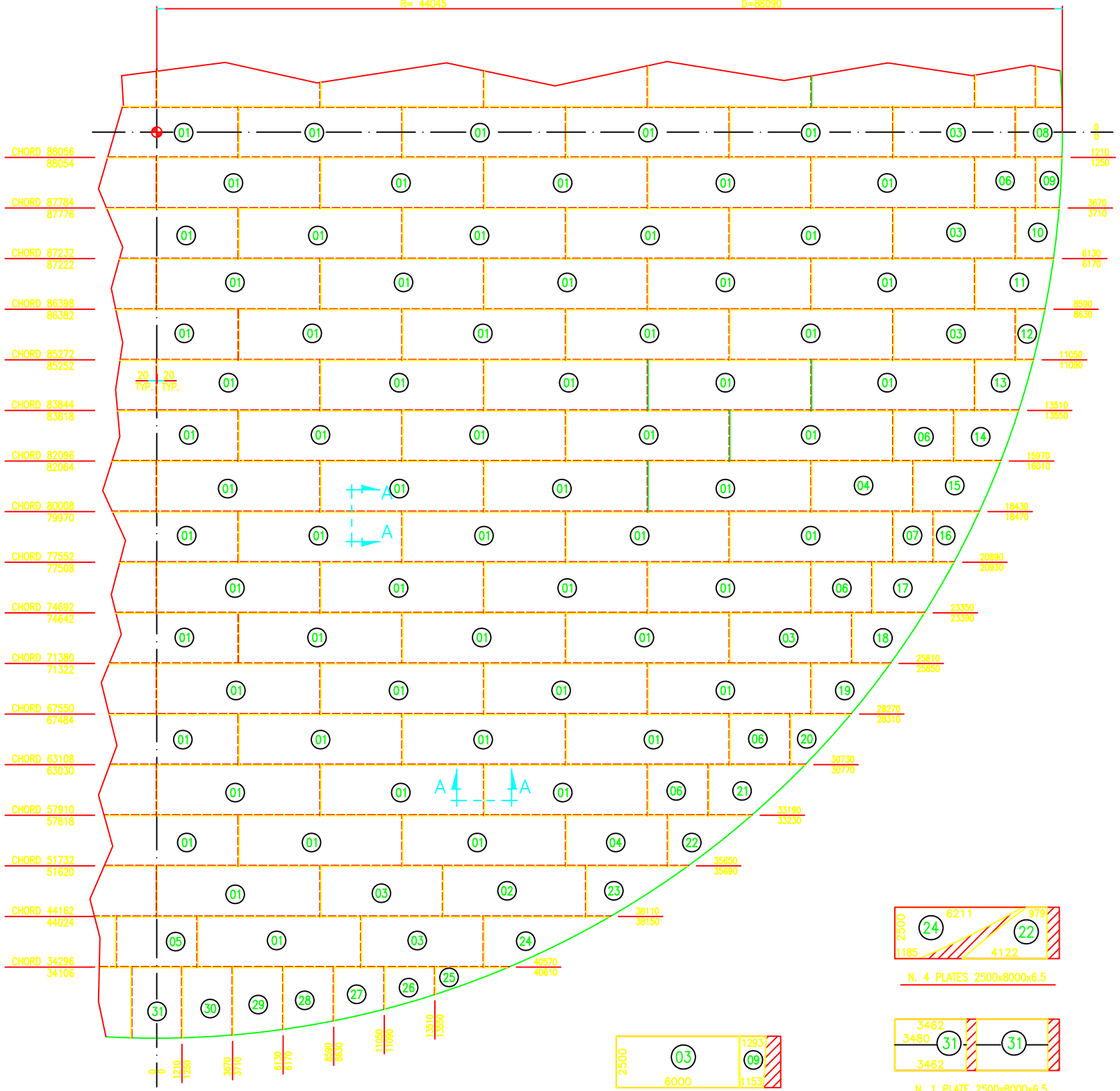


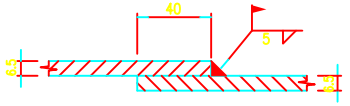




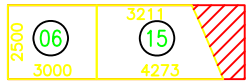


BULKHEADS CUT DETAIL

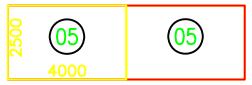




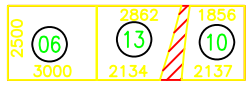
SECTION 'A–A'



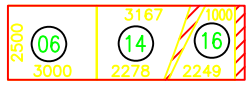
N. 4 PLATES 2500x8000x6.5



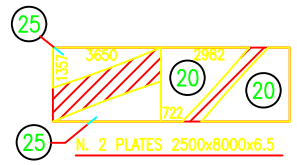
N. 1 PLATE 2500x8000x6.5



N. 4 PLATES 2500x8000x6.5



N. 4 PLATES 2500x8000x6.5



N. 2 PLATES 2500x8000x6.5

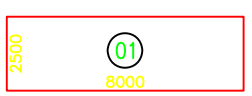
ITEM	QUANTITY	DESCRIPTION	MATERIAL	UNITARY WEIGHT	TOTAL WEIGHT	NOTE
01	247	PLATE Thk. 6.5 8000x2500	A 283 M Gr.380	1040	256880	
02	4	PLATE Thk. 6.5 7000x2500	A 283 M Gr.380	910	3640	
03	22	PLATE Thk. 6.5 6000x2500	A 283 M Gr.380	780	17160	
04	8	PLATE Thk. 6.5 5000x2500	A 283 M Gr.380	650	5200	
05	2	PLATE Thk. 6.5 4000x2500	A 283 M Gr.380	520	1040	
06	20	PLATE Thk. 6.5 3000x2500	A 283 M Gr.380	390	7800	
07	4	PLATE Thk. 6.5 2500x2000	A 283 M Gr.380	260	1040	
08	2	PLATE Thk. 6.5 2500x2290	A 283 M Gr.380	296.9	593.9	
09	4	PLATE Thk. 6.5 2500x1293	A 283 M Gr.380	160.6	642.4	
10	4	PLATE Thk. 6.5 2500x2137	A 283 M Gr.380	261.1	1044.3	
11	4	PLATE Thk. 6.5 3841x2500	A 283 M Gr.380	473.4	1893.4	
12	4	PLATE Thk. 6.5 2500x1444	A 283 M Gr.380	152.2	608.7	
13	4	PLATE Thk. 6.5 2862x2500	A 283 M Gr.380	326.5	1305.8	
14	4	PLATE Thk. 6.5 3167x2500	A 283 M Gr.380	355.7	1423	
15	4	PLATE Thk. 6.5 4273x2500	A 283 M Gr.380	488.4	1953.7	
16	4	PLATE Thk. 6.5 2500x2249	A 283 M Gr.380	213.3	853.4	
17	4	PLATE Thk. 6.5 4002x2500	A 283 M Gr.380	428	1712.2	
18	4	PLATE Thk. 6.5 3552x2500	A 283 M Gr.380	355	1419.9	
19	4	PLATE Thk. 6.5 3877x2500	A 283 M Gr.380	380.4	1521.8	
20	4	PLATE Thk. 6.5 2982x2500	A 283 M Gr.380	244.5	977.9	
21	4	PLATE Thk. 6.5 4741x2500	A 283 M Gr.380	449.2	1796.6	
22	4	PLATE Thk. 6.5 4122x2500	A 283 M Gr.380	338	1351.9	
23	4	PLATE Thk. 6.5 5014x2500	A 283 M Gr.380	411	1644	
24	4	PLATE Thk. 6.5 6211x2500	A 283 M Gr.380	498.2	1992.9	
25	4	PLATE Thk. 6.5 3650x1357	A 283 M Gr.380	134.6	538.5	
26	4	PLATE Thk. 6.5 2500x2072	A 283 M Gr.380	223.8	895	
27	4	PLATE Thk. 6.5 2634x2500	A 283 M Gr.380	306.9	1227.5	
28	4	PLATE Thk. 6.5 3051x2500	A 283 M Gr.380	370.7	1482.6	
29	4	PLATE Thk. 6.5 3327x2500	A 283 M Gr.380	415.8	1663.1	
30	4	PLATE Thk. 6.5 3463x2500	A 283 M Gr.380	442.7	1770.8	
31	2	PLATE Thk. 6.5 3480x2500	A 283 M Gr.380	451.6	903.3	

TOTAL WEIGHT Kg 323977

NOTES :

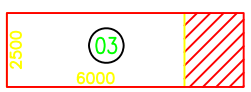
1) ALL BOTTOM DECK PLATES ARE WELDED WITH CONTINUOUS FILLET WELDS ON THE TOP SIDE. ON THE BOTTOM SIDE ALL SEAMS WITHIN 305 OF INTERNAL STIFFENERS (BULKHEADS AND RIMS), SUPPORTS AND OTHER RIGID MEMBERS ARE FILLET WELDED 50 / 250.
2) FOR GENERAL ASSEMBLY SEE DWG N° 2005-118-001.
3) ALL WELDS INDICATED WITH ⚑ ARE ON SITE WELDS.

REQUIRED PLATES EACH TANK
LOWER DECK PLATES (A 283 M Gr.380)
N°321 PLATES 2500x8000x6.5

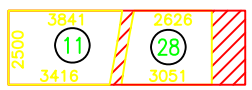


N. 247 PLATES 2500x8000x6.5

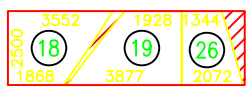
N. 4 PLATES 2500x8000x6.5



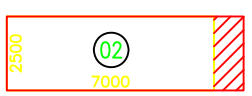
N. 10 PLATES 2500x8000x6.5



N. 4 PLATES 2500x8000x6.5

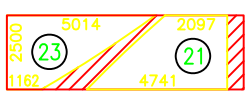


N. 4 PLATES 2500x8000x6.5

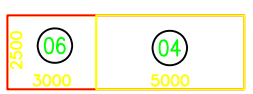


N. 4 PLATES 2500x8000x6.5

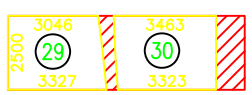
N. 4 PLATES 2500x8000x6.5



N. 4 PLATES 2500x8000x6.5

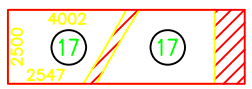


N. 8 PLATES 2500x8000x6.5



N. 4 PLATES 2500x8000x6.5

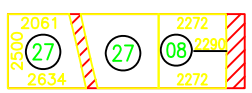
N. 4 PLATES 2500x8000x6.5



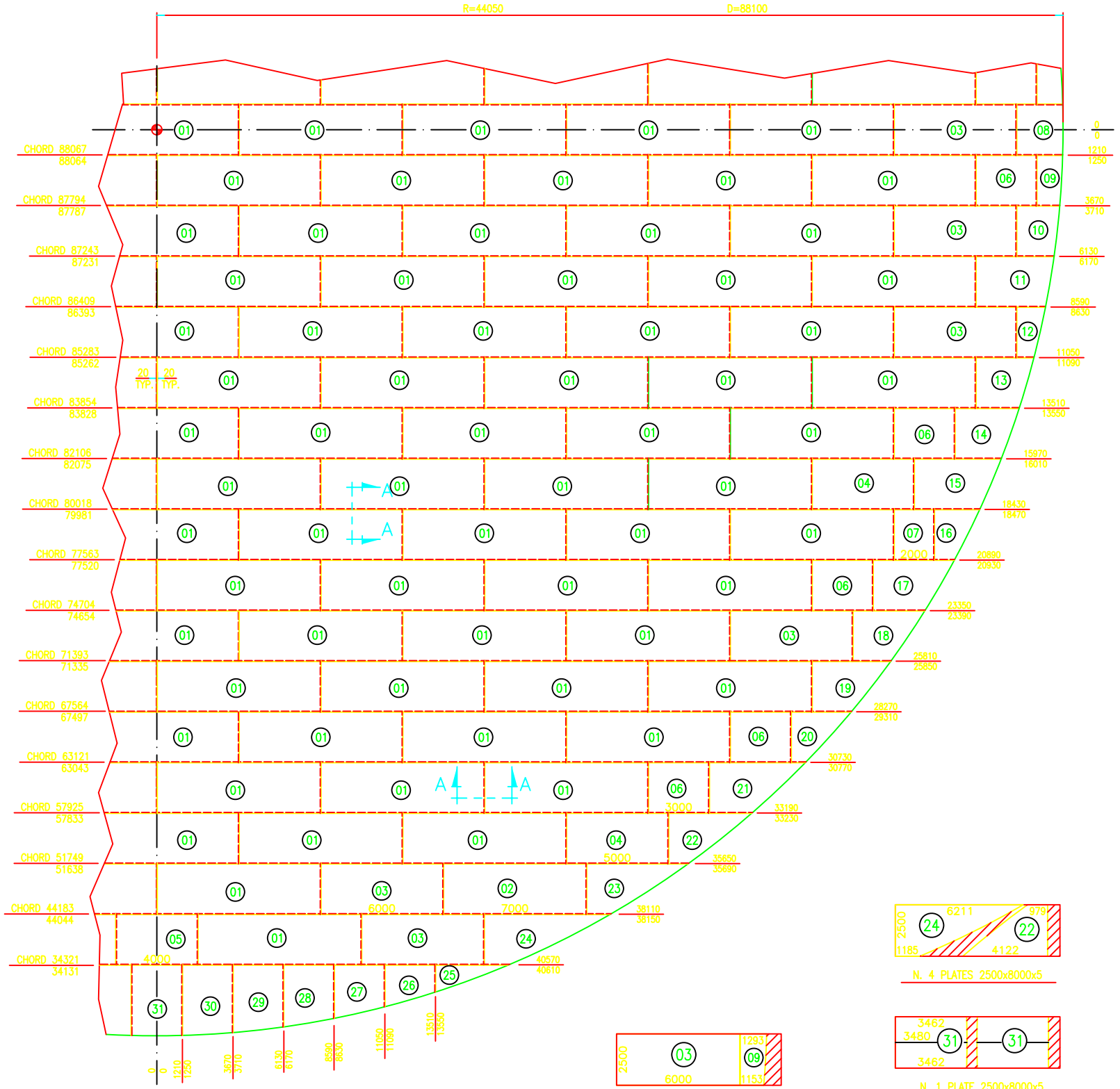
N. 2 PLATES 2500x8000x6.5

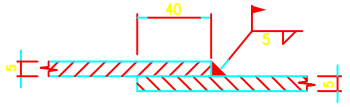
N. 4 PLATES 2500x8000x6.5

N. 1 PLATE 2500x8000x6.5



N. 2 PLATES 2500x8000x6.5

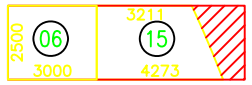




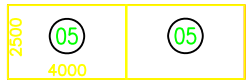
SECTION 'A–A.

ITEM	QUANTITY	DESCRIPTION	MATERIAL	UNITARY WEIGHT	TOTAL WEIGHT	NOTE
01	247	PLATE Thk. 5.5 8000x2500	A 283 M Gr.380	880	217360	
02	4	PLATE Thk. 5.5 7000x2500	A 283 M Gr.380	770	3080	
03	22	PLATE Thk. 5.5 6000x2500	A 283 M Gr.380	660	14520	
04	8	PLATE Thk. 5.5 5000x2500	A 283 M Gr.380	550	4400	
05	2	PLATE Thk. 5.5 4000x2500	A 283 M Gr.380	440	880	
06	20	PLATE Thk. 5.5 3000x2500	A 283 M Gr.380	330	6600	
07	4	PLATE Thk. 5.5 2500x2000	A 283 M Gr.380	220	880	
08	2	PLATE Thk. 5.5 2500x2290	A 283 M Gr.380	251.2	502.5	
09	4	PLATE Thk. 5.5 2500x1293	A 283 M Gr.380	135.8	543.4	
10	4	PLATE Thk. 5.5 2500x2137	A 283 M Gr.380	220.8	883.5	
11	4	PLATE Thk. 5.5 3841x2500	A 283 M Gr.380	400.5	1602.1	
12	4	PLATE Thk. 5.5 2500x1444	A 283 M Gr.380	128.8	515.3	
13	4	PLATE Thk. 5.5 2862x2500	A 283 M Gr.380	276.2	1104.8	
14	4	PLATE Thk. 5.5 3167x2500	A 283 M Gr.380	300.9	1203.8	
15	4	PLATE Thk. 5.5 4273x2500	A 283 M Gr.380	413.3	1653.1	
16	4	PLATE Thk. 5.5 2500x2249	A 283 M Gr.380	180.5	722.1	
17	4	PLATE Thk. 5.5 4002x2500	A 283 M Gr.380	362.2	1448.9	
18	4	PLATE Thk. 5.5 3552x2500	A 283 M Gr.380	300.4	1201.6	
19	4	PLATE Thk. 5.5 3877x2500	A 283 M Gr.380	321.9	1287.9	
20	4	PLATE Thk. 5.5 2982x2500	A 283 M Gr.380	206.9	827.6	
21	4	PLATE Thk. 5.5 4741x2500	A 283 M Gr.380	380.0	1520.2	
22	4	PLATE Thk. 5.5 4122x2500	A 283 M Gr.380	286.0	1144.0	
23	4	PLATE Thk. 5.5 5014x2500	A 283 M Gr.380	347.8	1391.3	
24	4	PLATE Thk. 5.5 6211x2500	A 283 M Gr.380	421.5	1686.1	
25	4	PLATE Thk. 5.5 3650x1357	A 283 M Gr.380	113.9	455.8	
26	4	PLATE Thk. 5.5 2500x2072	A 283 M Gr.380	189.3	757.2	
27	4	PLATE Thk. 5.5 2634x2500	A 283 M Gr.380	259.7	1038.8	
28	4	PLATE Thk. 5.5 3051x2500	A 283 M Gr.380	313.6	1254.4	
29	4	PLATE Thk. 5.5 3327x2500	A 283 M Gr.380	351.8	1407.1	
30	4	PLATE Thk. 5.5 3463x2500	A 283 M Gr.380	374.5	1498.2	
31	2	PLATE Thk. 5.5 3480x2500	A 283 M Gr.380	382.2	764.8	

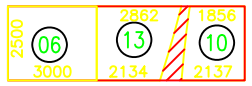
TOTAL WEIGHT Kg 274134



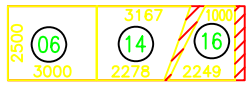
N. 4 PLATES 2500x8000x5



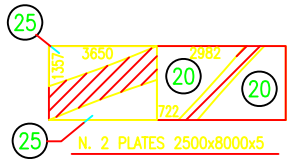
N. 1 PLATE 2500x8000x5



N. 4 PLATES 2500x8000x5



N. 4 PLATES 2500x8000x5



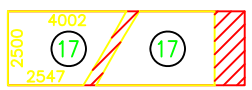
N. 2 PLATES 2500x8000x5

REQUIRED PLATES EACH TANK
UPPER DECK PLATES (A 283 M Gr.380)
N°321 PLATES 2500x8000x5

NOTES :

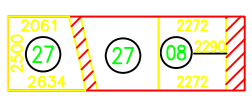
1) WHEN LYING THE TOP DECK, EVERYWHERE THE PLATES CROSS THE RAFTERS, A 3/16" DOWNHAND FILLET WELD ACROSS THE LENGTH OF THE RAFTER SHOULD BE MADE.
2) FOR GENERAL ASSEMBLY SEE DWG N° 2005-118-001.
3) ALL WELDS INDICATED WITH ARE ON SITE WELDS.

N. 4 PLATES 2500x8000x5



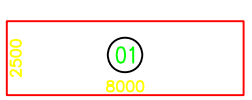
N. 2 PLATES 2500x8000x5

N. 1 PLATE 2500x8000x5

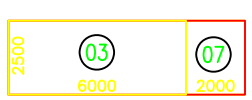


N. 2 PLATES 2500x8000x5

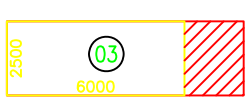
N. 4 PLATES 2500x8000x5



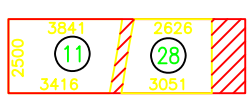
N. 247 PLATES 2500x8000x5



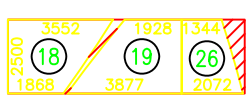
N. 4 PLATES 2500x8000x5



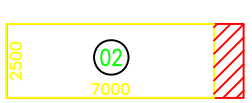
N. 10 PLATES 2500x8000x5



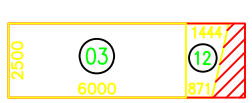
N. 4 PLATES 2500x8000x5



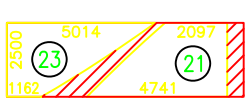
N. 4 PLATES 2500x8000x5



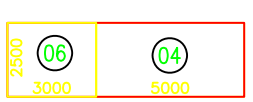
N. 4 PLATES 2500x8000x5



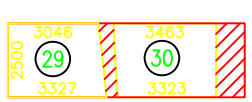
N. 4 PLATES 2500x8000x5



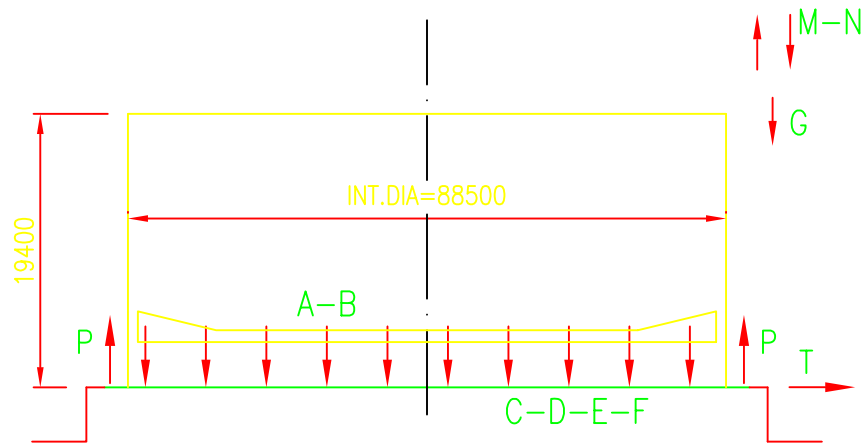
N. 4 PLATES 2500x8000x5



N. 8 PLATES 2500x8000x5



N. 4 PLATES 2500x8000x5



		ERECTION	OPERATING	HYDROTEST
TOTAL VERTICAL LOAD	(KN)	15380 ⚠	890940	1220800
TOTAL WIND LOAD	(KN)	2295	2525	1150
TOTAL SEISMIC LOAD	(KN)	1730	29540	/
MOMENT FROM WIND LOAD	(KNm)	22245	24470	11120
MOMENT FROM SEISMIC LOAD	(KNm)	11480	211320	/
TOTAL DEAD WEIGHTS	(KN)	15380 ⚠		

FOUNDATION LOADS

A	FLOATING ROOF TOTAL DEAD WEIGHTS	(KN)	7720
B	FLOATING ROOF TOTAL LIVE LOAD	(KN)	7315
C	LIQUID PRESSURE IN OPERATING	(KN/m2)	142
D	LIQUID PRESSURE IN HYDROTEST	(KN/m2)	196
E	PRESSURE FROM BOTTOM WEIGHT	(KN/m2)	0.79
F	PRESSURE FROM EARTHQUAKE	(KN/m2)	/
G	UNIT FORCE FROM DEAD WEIGHTS	(N/m)	37840
M	UNIT FORCE FROM WIND MOMENT IN OPERATING	(N/m)	3980
N	UNIT FORCE FROM SEISMIC MOMENT IN OPERATING	(N/m)	34345

NUMBER OF ANCHOR BOLTS N.A.

			PRESSION	WIND	EARTHQUAKE
P	AXIAL FORCE	(N)	N.A.	N.A.	N.A.
T	SHEAR FORCE	(N)	N.A.	N.A.	N.A.

NOTES

1 – FOUNDATION TOLERANCES:

THE TOP OF THE FOUNDATION SHALL BE LEVEL WITHIN ± 3mm IN ANY 9m OF THE CIRCUMFERENCE AND WITHIN ± 6mm IN TOTAL CIRCUMFERENCE FROM THE AVERAGE ELEVATION

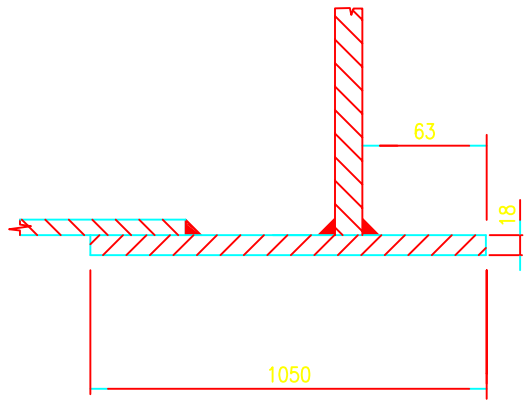
2 – FOUNDATION SETTLEMENT LIMITATION:

–DIFFERENTIAL SETTLEMENT ACROSS THE FOUNDATION (I.E. TILT OF THE BASE SLAB AS A WHOLE) SHOULD NOT EXCEED 177 mm

–DIFFERENTIAL SETTLEMENT BETWEEN EDGE AND CENTRE OF THE FOUNDATION SHOULD NOT EXCEED 147mm

–DIFFERENTIAL SETTLEMENT AROUND THE PERIPHERY SHOULD NET EXCEED 20mm OVER ANY 10 Meter LENGHT AND SHOULD BE LIMITED TO 177mm BETWEEN ANY TWO POINTS AROUND PERIPHERY.

– FOR "GENERAL ASSEMBLY" SEE DWG. N. 2005–118–001



ANNULAR PLATE DETAIL

REV.	DATE	DESCRIPTION	PREPARED	VERIFIED	APPROVED AUTHORIZED
C1	JULY 22, 2005	ISSUED FOR CONSTRUCTION REVISED WHERE INDICATED ⚠	UTE		
A1	MAY 04, 2005	ISSUED FOR APPROVAL	UTE		

AGIP OIL COMPANY LIMITED

MELLITAH STORAGE AND EXPORT SYSTEM UPGRANDING

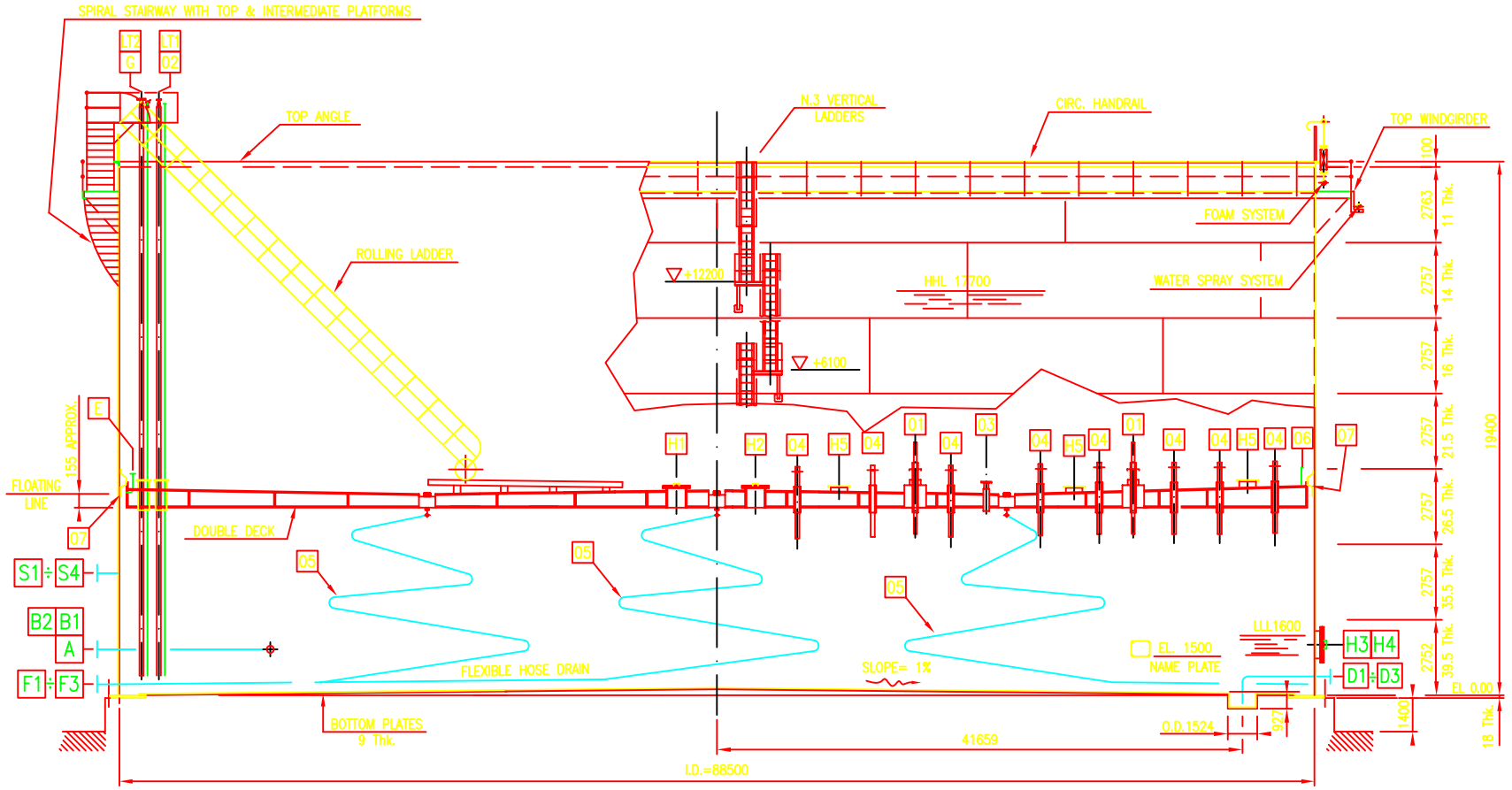
BENTINI

PARESA CESENA – ITALY

ITEM: 4E–220–TB–005 : WAFA & EL FEEL OIL STORAGE TANK
I.D.=88500 H=19400 WORKING VOLUME=99038 m^3

FOUNDATION LOADS

Plant Area	Plant/Cluster or Train ID	Plant Unit	DWG Scale
–	–	–	NOT TO SCALE
Company Contract No.	**Company – Contractor DWG No.**		**Sheet**
–	X–85–D–M–4022–02		1 of 1
SubContractor Job No.	**SubContractor DWG No.**		**Rev.** / **Size**
2056/SA/00/04 Rev.0	2005–118–FL1		C1 / C



MATERIALS

BOTTOM PLATES	A 283 M Gr.380
ANNULAR PLATES	A 573 M Gr.485 MOD
SHELL PLATES FROM 1st TO 6 COURSE	A 573 M Gr.485 MOD
SHELL PLATES 7 COURSE	A 283 M Gr.380
FLOATING ROOF PLATES	A 283 M Gr.380
TOP ANGLE L100x10	S 275 JR / EN 10025
STRUCTURES	S 235 JR / EN 10025
FOAM SYSTEM	CARBON STEEL GALVANIZED
WATER SPRAY SYSTEM	CARBON STEEL GALVANIZED
NOZZLE NECKS/PIPES	ASTM A 106 Gr.B
PIPES	API 5L Gr.B
FLANGES	ASTM A 105
STUD BOLTS + NUTS (WATER SPRAY & FOAM SYSTEMS)	ASTM A 193 B7 ASTM A 194 2H HOT DIP GALVANIZED
BOLTS + NUT	C.S. cl. 8.8. GALVANIZED
GASKETS	COMPRESSED GLASS FIBER ASBESTOS FREE

FITTINGS

Q.TY	DESCRIPTION	NOTES
1	HELICOIDAL STAIRWAY	
3	VERTICAL LADDERS	
1	TOP STIFFENING WALKWAY	See note 9
1	TOP PLATFORM	
1	ROLLING LADDER C/W RUNWAY	
YES	FOAM SYSTEM	See note 6
YES	WATER SPRAY SYSTEM	See note 7
4	PROTECTIVE SHIELDS	
NONE	INTERMEDIATE WIND GIRDERS	See note 8
12	EARTHING BOSSES	
1	CLIP FOR CATHODIC PROTECTION	

APPURTENANCES LIST

Q.TY	DESCRIPTION	SIZE	NOTES
4	AUT. BLEEDER VENTS	16" DIA	
2	RIM VENTS	6" DIA	
1	GAUGE HATCH	8" DIA	
12	FOAM CHAMBERS		
106	WATER SPRAY NOZZLES		

DESIGN DATA

CODE (See note 1)	API 650 10th ED. APP. E + APP. C	WIND VELOCITY (UBC "97")	145 Km/h IW=1.15 EXP. ZONE = C
DIAMETER	88500 mm		
HEIGHT	19400 mm	EARTHQUAKE (UBC "97")	ZONE = 2A SITE FACTOR = SC IMPOR. FACT. = 1.25
OPERATING TEMPERATURE	40 °C		
DESIGN TEMPERATURE	70 °C	SERVICE	WAFA & EL FEEL OIL STORAGE TANK
OPERATING PRESSURE	ATM.	WORKING CAPACITY	99038 m^3
DESIGN PRESSURE	HYDR.	CORROSION ALLOWANCE	1.5 – 3 mm (See note 2)
MIN. DESIGN METAL TEMPERATURE	2.5 °C	FLOATING ROOF TYPE	REVERSE SLOPE DOUBLE DECK
DESIGN PRODUCT DENSITY	820 Kg/m^3	SEAL TYPE	DOUBLE SEAL WITH PANTOGRAPHS
INSULATION	NO	FLASH POINT	<25° C
INTERNAL EPOXY COATING	YES (BOTTOM, AND 1st SHELL COURSE)	BOTTOM TYPE	APEX UP

SHELL NOZZLES LIST

ITEM	Q.TY	DN	RATING	SERVICE	ELEVATION (mm)	OVERHANG (mm)	NOTES
A	1	24"	S.O. 150#RF	INLET	730	395 △	See note 3
B1/B2	2	36"	S.O. 150#RF	OUTLET	925	SEE DWG	See notes 3, 14
S1÷S4	4	1"	S.O. 300#RF	SAMPLE CONNECTIONS	3600,7600 11600,15600	SEE DWG	
F1/F2/F3	3	4"	S.O. 150#RF	ROOF DRAIN	225	210	
D1/D2/D3	3	6"	S.O. 150#RF	DRAIN	275	200	
H3	1	24"	API STD 650	MANHOLE	750	190	BLIND FLG.
H4	1	34"	STD PRS	MANHOLE	1000	190	See note 5 BLIND FLG.

DRAWINGS LIST

DESCRIPTION	PARESA/BENTINI DWG N°	COMPANY DWG N°	WEIGHT [Kg]
FOUNDATION LOADS	2005-118-FL1	X-85-D-M-4022-02	/
GENERAL ASSEMBLY	2005-118-001	X-85-D-M-4022-03	/
ORIENTATIONS	2005-118-002	X-85-D-M-4022-04	/
BOTTOM PLATES	2005-118-003	X-85-D-M-4022-05	479721
SHELL PLATES	2005-118-004	X-85-D-M-4022-06	1009901
DOUBLE DECK – ASSEMBLY	2005-118-005	X-85-D-M-4022-07	127390
LOWER DECK PLATES	2005-118-006	X-85-D-M-4022-08	323977
UPPER DECK PLATES	2005-118-007	X-85-D-M-4022-09	274134
WINDGIRDER AND HANDRAILS	2005-118-008	X-85-D-M-4022-10	28587
SPIRAL STAIRWAY	2005-118-009	X-85-D-M-4022-11	2021
VERTICAL LADDERS	2005-118-010	X-85-D-M-4022-12	1238
TOP PLATFORM	2005-118-011	X-85-D-M-4022-13	1922
ROLLING LADDER	2005-118-012	X-85-D-M-4022-14	2427
RUNWAY FOR ROLLING LADDER	2005-118-013	X-85-D-M-4022-15	435
SHELL MANHOLES	2005-118-014	X-85-D-M-4022-16	1461
SHELL NOZZLES AND ACCESSORIES	2005-118-015	X-85-D-M-4022-17	12511
NAME PLATE	2005-118-016	X-85-D-M-4022-18	2
ROOF SUPPORTS	2005-118-017	X-85-D-M-4022-19	15628
ROOF MANHOLES	2005-118-018	X-85-D-M-4022-20	4150
AUTOMATIC BLEEDER VENTS 16" DIA	2005-118-019	X-85-D-M-4022-21	724
RIM VENTS 6" DIA	2005-118-020	X-85-D-M-4022-22	74
GUIDE POLE 6"x12" DIA–STILLING WELL FOR LT1	2005-118-021	X-85-D-M-4022-23	2166
STILLING WELL FOR LT2 AND FOR GAUGE HATCH "G"	2005-118-022	X-85-D-M-4022-24	3174
FLEXIBLE ROOF DRAIN	2005-118-023	X-85-D-M-4022-25	516
EMERGENCY DRAIN 6" DIA	2005-118-024	X-85-D-M-4022-26	324
PROTECTIVE SHIELDS	2005-118-025	X-85-D-M-4022-27	828
FOAM DAM	2005-118-026	X-85-D-M-4022-28	5735
WATER SPRAY SYSTEM	2005-118-027	X-85-D-M-4022-29	12425
LOW EXPANSION FOAM SYSTEM	2005-118-028	X-85-D-M-4022-30	14438
DOUBLE SEAL WITH PANTOGRAPHS	2005-118-029	X-85-D-M-4022-31	12824
PRIMARY SEALING SYSTEM	2005-118-030	X-85-D-M-4022-32	5721
SECONDARY SEALING SYSTEM	2005-118-031	X-85-D-M-4022-33	3572
OVERVIEW OF WATER SPRAY SYSTEM	2005-118-032	X-85-D-M-4022-34	/
OVERVIEW OF LOW EXPANSION FOAM SYSTEM	2005-118-033	X-85-D-M-4022-35	/
P&ID WATER SPRAY SYSTEM AND LOW EXPANSION SYSTEM	2005-118-034	X-85-D-M-4022-36	/
		TOTAL WEIGH	2348026

SURFACE TREATMENT

1) TANK TO BE INTERNAL AND EXTERNAL COATED.

2) GENERAL PRESCRIPTION REGARDING PREPARATION FOR INTERNAL COATING:
(FOR BOTTOM AND FIRST SHELL COURSE ONLY)

- ALL INTERNAL WELDS MUST BE GROUND SMOOTH WITH A MIN. RADIUS OF 3mm
- INTERNAL WELDS FLUX, SPLATTER AND PITTING MUST BE AVOIDED
- ALL INTERNAL CORNERS AND SHARP EDGES MUST BE AVOIDED
- AVOID INTERNAL GAPS

GENERAL NOTES

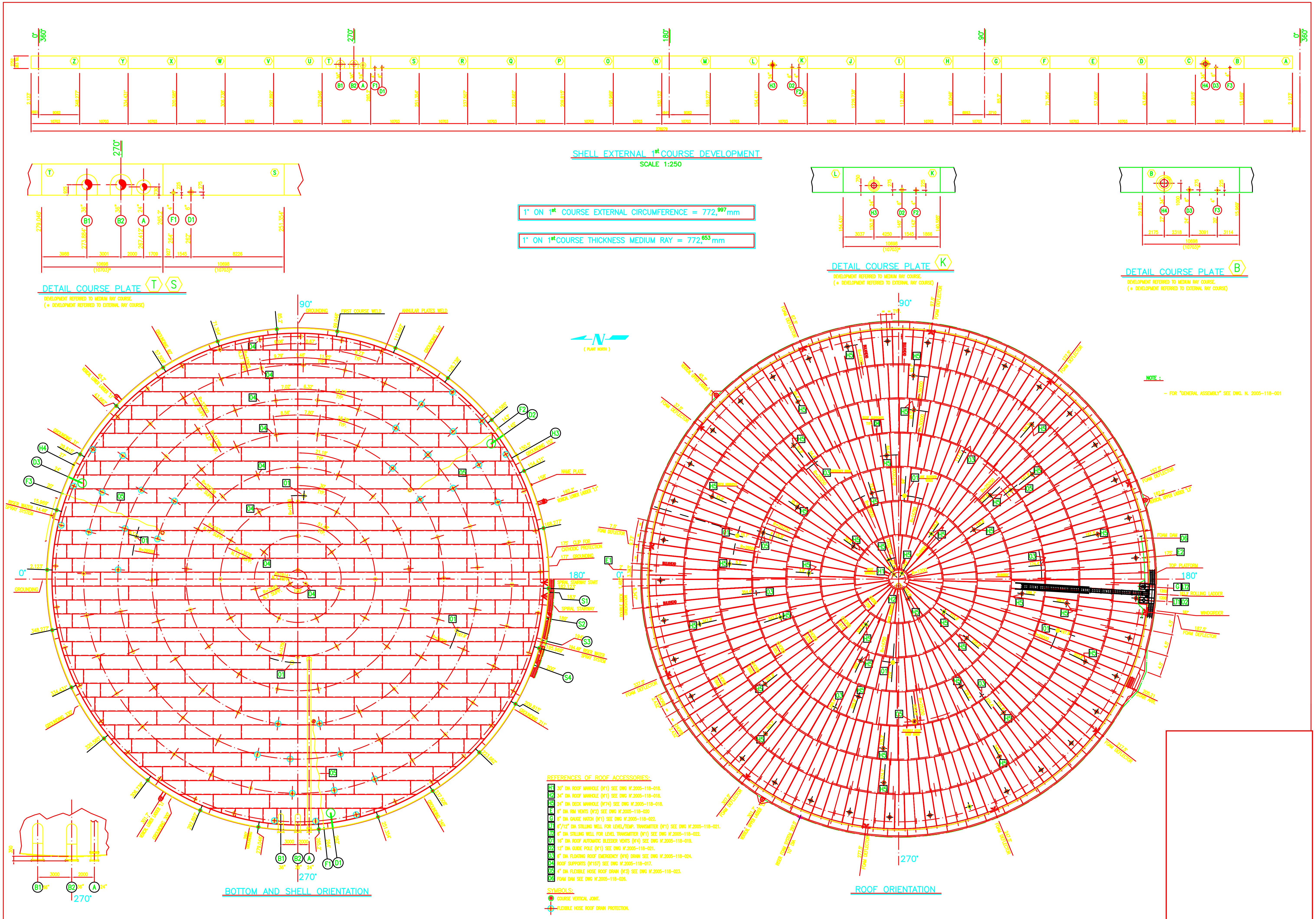
1) CALCULATION OF SHELL THICKNESSES ACCORDING TO VARIABLE-DESIGN POINT METHOD WITH A DESIGN LIQUID LEVEL OF 19.4 m.
2) 3 mm C.A. ON FIRST COURSE, ANNULAR AND CENTRAL BOTTOM PLATES; 1.5 mm C.A. ON OTHER COURSES AND WETTED SURFACES OF FLOATING ROOF (BOTTOM DECK AND OUTER RIM).
3) LOW TYPE CONNECTION ACCORDING TO API 650.
4) 3" Sch 80 / 4" Sch 40.
5) AS PER MANUFACTURER STANDARD.
6) WITH ONE SINGLE SYSTEM (ONE RISER).
7) WITH TWO SEPARATE SYSTEMS (TWO RISERS).
8) INTERMEDIATE WIND GIRDERS HAVE BEEN AVOIDED INCREASING SHELL PLATE THICKNESSES ACCORDING TO PARA 3.6.1.6 OF API 650; SHELL NOMINAL THICKNESSES HAVE BEEN CONSIDERED (UNCORRODED CONDITION).
9) TOP WIND GIRDER HAS BEEN DESIGNED CONSIDERING A REDUCED TANK DIAMETER EQUAL TO 60 m ACCORDING TO PARA 3.9.6.1 OF API 650.
10) 80% AROMATIC CONTENT RESISTANT AND BALLASTED WITH WIRE FULLY EMBEDDED IN RUBBER.
11) MINIMUM ROOF PLATES THK: 5 mm FOR PLATES NOT IN CONTACT WITH PRODUCT; 6.5 mm FOR PLATES IN CONTACT WITH PRODUCT.
12) MINIMUM BOTTOM PLATES SIZE: 2.5 m x 10 m.
13) MINIMUM TOP AND BOTTOM DECK PLATES SIZE: 2.5 m x 8 m.
14) FLANGE ACCORDING TO ASME B16.47 SERIE "A".
15) COMPLETED WITH NO-RETURN VALVE.

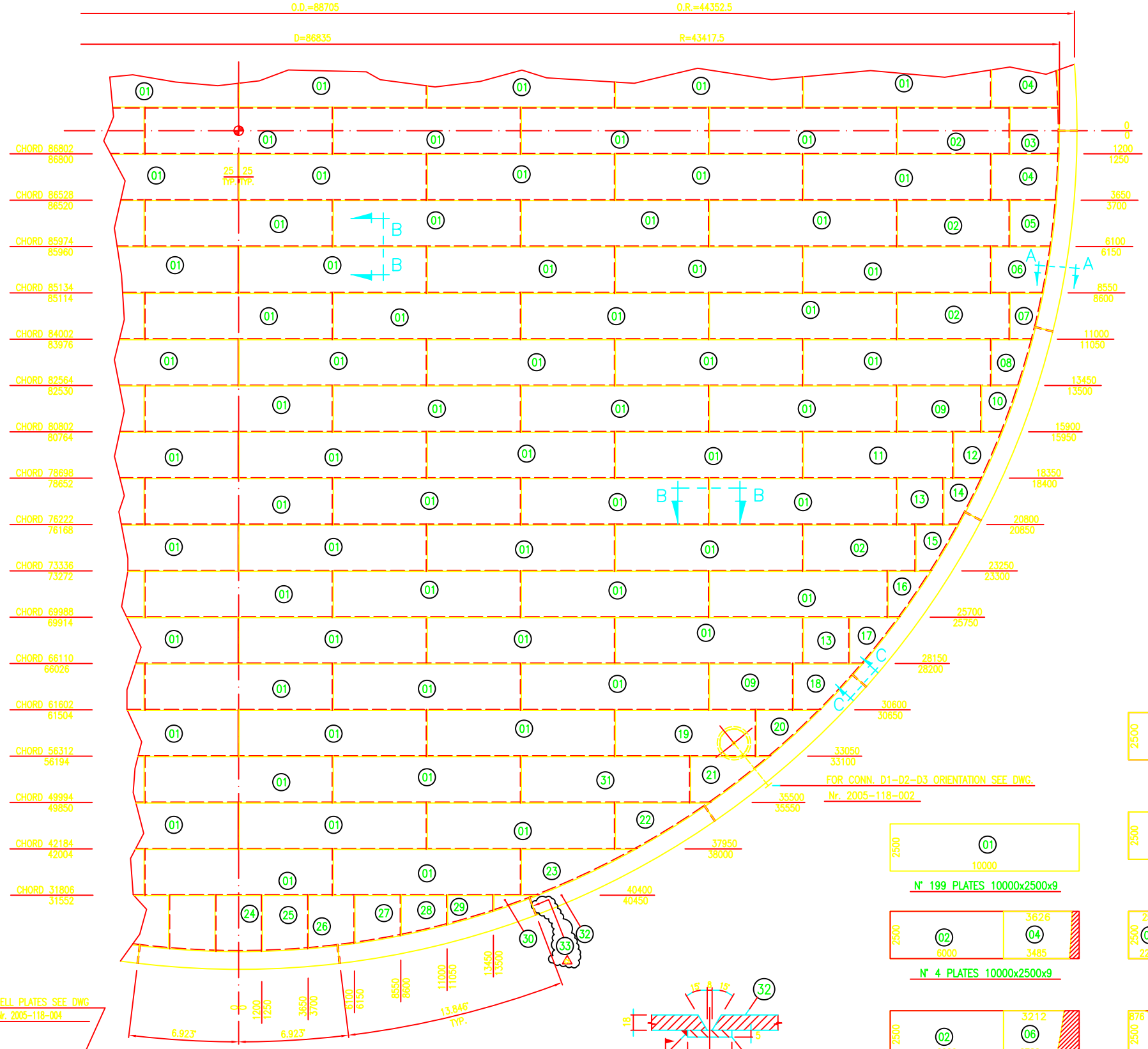
FLOATING ROOF NOZZLES

ITEM	Q.TY	DN	SERVICE	NOTES
H1	1	30"	ROOF MANHOLE FOR ACCESS TO THE TANK	API STANDARD 650
H2	1	34"	ROOF MANHOLE FOR ACCESS TO THE TANK	MANIFACTURED STANDARD
H5	74	24"	DECK MANWAY	
E	2	6"	RIM VENTS	
G	1	8"	GAUGE HATCH	"AGIP" STANDARD
LT1	1	6"/2"	STILLING WELL FOR LEVEL / TEMPERATURE TRANSMITTER	"AGIP" STANDARD
LT2	1	6"	STILLING WELL FOR LEVEL TRANSMITTER	"AGIP" STANDARD
01	4	16"	ROOF AUTOMATIC BLEEDER VENTS	
02	1	12"	GUIDE POLE	
03	6	6"	FLOATING ROOF EMERGENCY DRAINS	

FLOATING ROOF ACCESSORIES

ITEM	Q.TY	DN	SERVICE	NOTES
04	157	3"/4"	ROOF SUPPORTS	See note 4
05	3	4"	FLEXIBLE HOSE ROOF DRAIN	See notes 10, 15
06	1	–	FOAM DAM	H=600 mm
07	1	–	DOUBLE SEAL WITH PANTOGRAPHS	


SHELL EXTERNAL 1st COURSE DEVELOPMENT
SCALE 1:250
1° ON 1st COURSE EXTERNAL CIRCUMFERENCE = 772,997 mm
1° ON 1st COURSE THICKNESS MEDIUM RAY = 772,653 mm
DETAIL COURSE PLATE T S
DEVELOPMENT REFERRED TO MEDIUM RAY COURSE.
(* DEVELOPMENT REFERRED TO EXTERNAL RAY COURSE)
DETAIL COURSE PLATE K
DEVELOPMENT REFERRED TO MEDIUM RAY COURSE.
(* DEVELOPMENT REFERRED TO EXTERNAL RAY COURSE)
DETAIL COURSE PLATE B
DEVELOPMENT REFERRED TO MEDIUM RAY COURSE.
(* DEVELOPMENT REFERRED TO EXTERNAL RAY COURSE)
NOTE :
- FOR "GENERAL ASSEMBLY" SEE DWG. N. 2005-118-001
N
(PLANT NORTH)
BOTTOM AND SHELL ORIENTATION
ROOF ORIENTATION
REFERENCES OF ROOF ACCESSORIES:
H1 30" DIA ROOF MANHOLE (N°1) SEE DWG N°.2005-118-018.
H2 24" DIA ROOF MANHOLE (N°1) SEE DWG N°.2005-118-018.
H5 24" DIA DECK MANHOLE (N°74) SEE DWG N°.2005-118-018.
E 8" DIA RIM VENTS (N°2) SEE DWG N°.2005-118-020
G 8" DIA GAUGE HATCH (N°1) SEE DWG N°.2005-118-022.
LT1 8"/12" DIA STILLING WELL FOR LEVEL/TEMP. TRANSMITTER (N°1) SEE DWG N°.2005-118-021.
LT2 8" DIA STILLING WELL FOR LEVEL TRANSMITTER (N°1) SEE DWG N°.2005-118-022.
01 16" DIA ROOF AUTOMATIC BLEEDER VENTS (N°4) SEE DWG N°.2005-118-019.
02 12" DIA GUIDE POLE (N°1) SEE DWG N°.2005-118-021.
03 6" DIA FLOATING ROOF EMERGENCY (N°6) DRAIN SEE DWG N°.2005-118-024.
04 ROOF SUPPORTS (N°157) SEE DWG N°.2005-118-017.
05 4" DIA FLEXIBLE HOSE ROOF DRAIN (N°3) SEE DWG N°.2005-118-023.
06 FOAM DAM SEE DWG N°.2005-118-026.
SYMBOLS:
COURSE VERTICAL JOINT.
FLEXIBLE HOSE ROOF DRAIN PROTECTION.



ITEM	QUANTITY	DESCRIPTION	MATERIAL	UNITARY WEIGHT	TOTAL WEIGHT	NOTE
01	199	PLATE Thk. 9 10000x2500	A 283 M Gr.380	1800	358200	
02	14	PLATE Thk. 9 6000x2500	A 283 M Gr.380	1080	15120	
03	2	PLATE Thk. 9 2668x2500	A 283 M Gr.380	479.1	958.1	
04	4	PLATE Thk. 9 3626x2500	A 283 M Gr.380	642.1	2568.5	
05	4	PLATE Thk. 9 2514x2500	A 283 M Gr.380	429.1	1716.5	
06	4	PLATE Thk. 9 3212x2500	A 283 M Gr.380	541.7	2166.9	
07	4	PLATE Thk. 9 2500x1817	A 283 M Gr.380	277.3	1109.2	
08	4	PLATE Thk. 9 2500x2226	A 283 M Gr.380	336.9	1347.7	
09	8	PLATE Thk. 9 4500x2500	A 283 M Gr.380	810	6480	
10	4	PLATE Thk. 9 2500x2032	A 283 M Gr.380	287.3	1149.2	
11	4	PLATE Thk. 9 8000x2500	A 283 M Gr.380	1440	5760	
12	4	PLATE Thk. 9 2626x2500	A 283 M Gr.380	378.7	1514.9	
13	8	PLATE Thk. 9 2500x2500	A 283 M Gr.380	450	3600	
14	4	PLATE Thk. 9 2500x2099	A 283 M Gr.380	267	1067.9	
15	4	PLATE Thk. 9 2500x2336	A 283 M Gr.380	291.1	1164.4	
16	4	PLATE Thk. 9 2500x2368	A 283 M Gr.380	276.1	1104.4	
17	4	PLATE Thk. 9 2719x2500	A 283 M Gr.380	315.6	1262.4	
18	4	PLATE Thk. 9 3755x2500	A 283 M Gr.380	474.1	1896.2	
19	4	PLATE Thk. 9 7500x2500	A 283 M Gr.380	1350	5400	
20	4	PLATE Thk. 9 3476x2500	A 283 M Gr.380	389.3	1557.2	
21	4	PLATE Thk. 9 4306x2500	A 283 M Gr.380	493.8	1975.1	
22	4	PLATE Thk. 9 5122x2500	A 283 M Gr.380	576.8	2307.4	
23	4	PLATE Thk. 9 6192x2500	A 283 M Gr.380	664.2	2656.7	
24	2	PLATE Thk. 9 3017x2500	A 283 M Gr.380	542.1	1084.1	
25	4	PLATE Thk. 9 3001x2500	A 283 M Gr.380	529.6	2118.5	
26	4	PLATE Thk. 9 2864x2500	A 283 M Gr.380	492.1	1968.5	
27	4	PLATE Thk. 9 2587x2500	A 283 M Gr.380	429.2	1716.9	
28	4	PLATE Thk. 9 2500x2167	A 283 M Gr.380	340.3	1361.2	
29	4	PLATE Thk. 9 2500x1601	A 283 M Gr.380	224.4	897.7	
30	4	PLATE Thk. 9 2453x882	A 283 M Gr.380	80.3	321.3	
31	4	PLATE Thk. 9 9000x2500	A 283 M Gr.380	1620	6480	
32	26	PLATE Thk. 18 10692x1366	A 573 M Gr.485 MOD	1601.4	41636.4	
△ 33	26	PLATE 50x5 L= 1050	S 235 JR EN 10025	2.1	53.6	

TOTAL WEIGHT Kg 479721

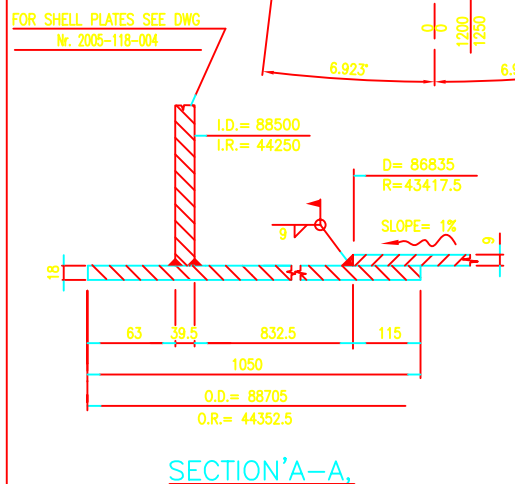
REQUIRED PLATES
EACH TANK

BOTTOM PLATES (A 283 M Gr.380)
N°247 PLATES 10000x2500x9

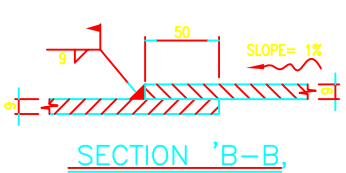
- FOR 'GENERAL ASSEMBLY' SEE DWG. N° 2005-118-001

NOTES:

1) FOR ORIENTATION BOTTOM PLATES SEE DWG N° 2005-118-002
2) IF NOT INDICATED "SHOP WELD", ALL WELDINGS ARE CARRIED-OUT AT SITE (△)

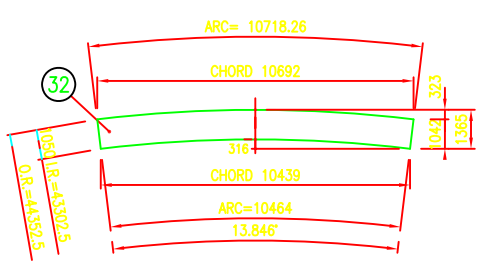


SECTION 'A-A'



SECTION 'B-B'

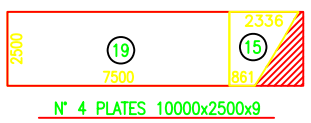
SECTION 'C-C'



N° 199 PLATES 10000x2500x9

N° 4 PLATES 10000x2500x9

N° 4 PLATES 10000x2500x9



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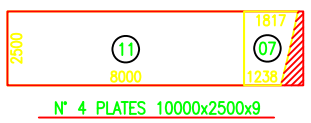

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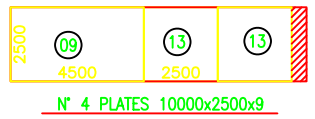

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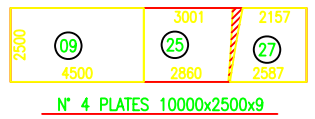
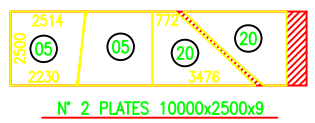
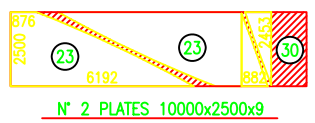


N° 4 PLATES 10000x2500x9



N° 2 PLATES 10000x2500x9



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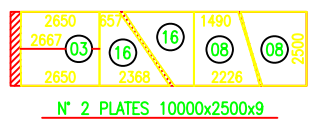

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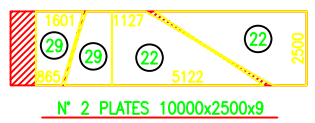
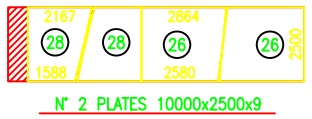


N° 2 PLATES 10000x2500x9

N° 2 PLATES 10000x2500x9



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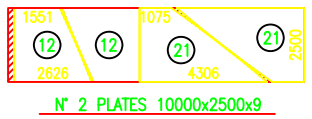

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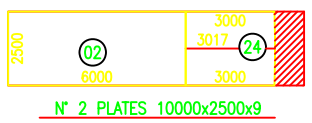

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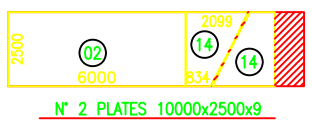

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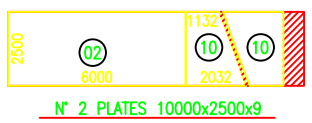

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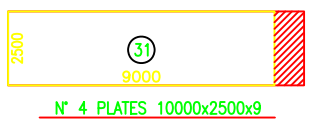
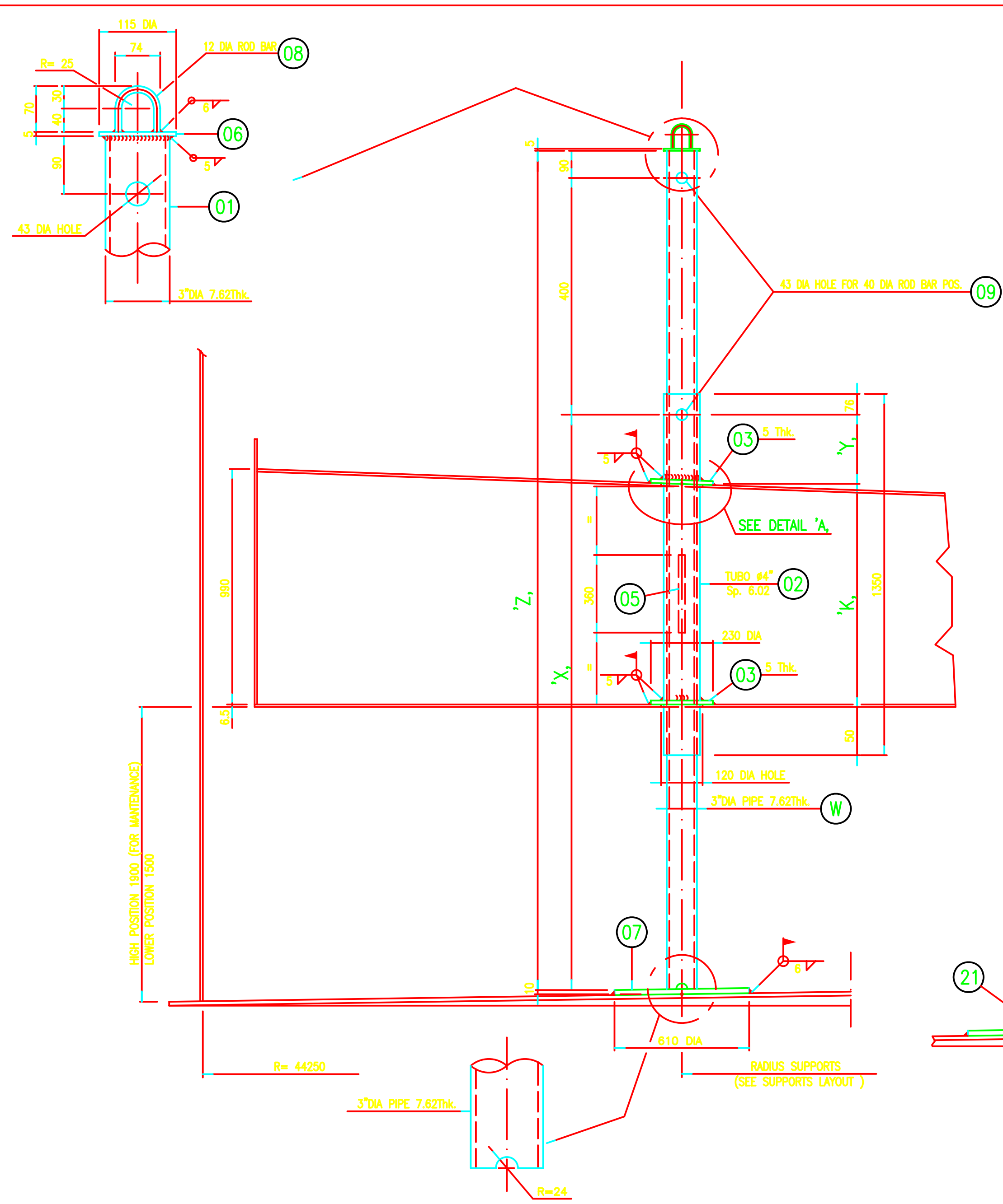
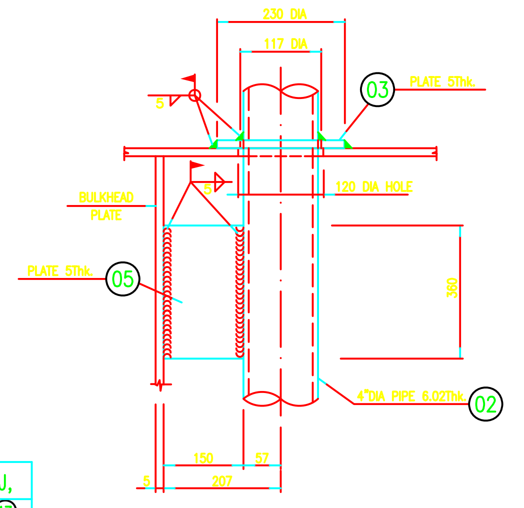


N° 4 PLATES 10000x2500x9



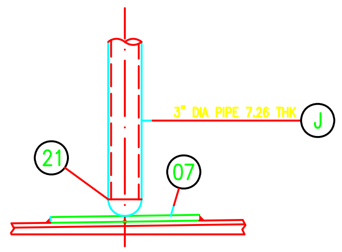


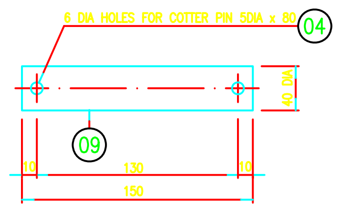
DETAIL 'A'

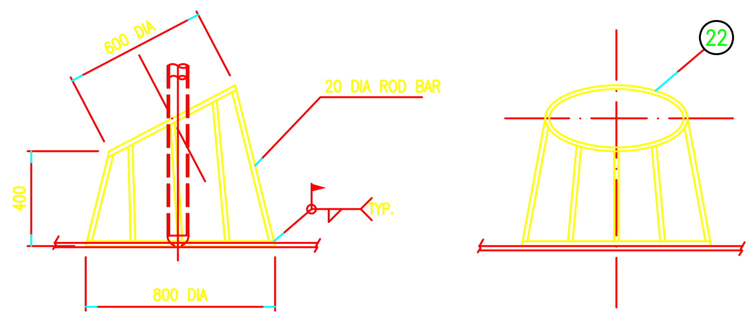
ITEM	QUANTITY	DESCRIPTION		MATERIAL	UNITARY WEIGHT	TOTAL WEIGHT	NOTE
01	28	3" DIA PIPE 7.62 Thk.	L= 3190	API 5L Gr.X42	48.7	1363.6	
02	157	4" DIA PIPE 6.02 Thk.	L= 1350	API 5L Gr.X42	21.7	3407.2	
03	314	SKETCH PLATE Thk. 5	O.D.230/I.D.117	A 283 M Gr.380	1.2	386.8	
04	314	COTTER-PIN	L=80	S.S	-	-	
05	157	PLATE Thk. 5	360x150	A 283 M Gr.380	2.2	339.1	
06	157	SKETCH PLATE Thk. 5	115 DIA	S 235 JR EN 10025	0.4	65.2	
07	157	SKETCH PLATE Thk. 10	610 DIA	A 283 M Gr.380	23.4	3670.6	
08	157	12 DIA ROD BAR	L= 190~	S 235 JR EN 10025	0.2	24.4	
09	157	40 DIA ROD BAR	L= 150	C40	1.9	294.0	
10	22	3" DIA PIPE 7.62 Thk.	L= 3140	API 5L Gr.X42	48.0	1056.0	
11	18	3" DIA PIPE 7.62 Thk.	L= 3079	API 5L Gr.X42	47.0	846.0	
12	16	3" DIA PIPE 7.62 Thk.	L= 3019	API 5L Gr.X42	46.1	737.6	
13	17	3" DIA PIPE 7.62 Thk.	L= 2959	API 5L Gr.X42	45.2	768.3	
14	12	3" DIA PIPE 7.62 Thk.	L= 2898	API 5L Gr.X42	44.3	531.2	
15	7	3" DIA PIPE 7.62 Thk.	L= 2838	API 5L Gr.X42	43.3	303.4	
16	3	3" DIA PIPE 7.62 Thk.	L= 2778	API 5L Gr.X42	42.4	127.3	
17	9	3" DIA PIPE 7.62 Thk.	L= 3145	API 5L Gr.X42	48.0	432.0	
18	10	3" DIA PIPE 7.62 Thk.	L= 3095	API 5L Gr.X42	47.3	479.0	
19	9	3" DIA PIPE 7.62 Thk.	L= 3052	API 5L Gr.X42	46.6	419.4	
20	6	3" DIA PIPE 7.62 Thk.	L= 2974	API 5L Gr.X42	45.4	272.4	
21	34	3" DIA SPHERICAL HEAD 8 Thk.		S 235 JR EN 10025	0.6	20.4	
22	34	20 DIA ROD BAR	L= 10000~	S 235 JR EN 10025	2.47	84.0	

TOTAL WEIGHT Kg 15628

SUPPORTS RAY	QT. SUPP.	'K'	'Y'	'X'	'Z'	'W'	'J'
42825	37	961	263	2700	3190	01	17
37800	32	816	408	2650	3140	10	18
31769	27	642	582	2589	3079	11	19
25738	22	524	700	2529	3019	12	20
19707	17	651	573	2469	2959	13	
13676	12	776	448	2408	2898	14	
7645	7	901	323	2348	2838	15	
1614	3	1026	198	2288	2778	16	





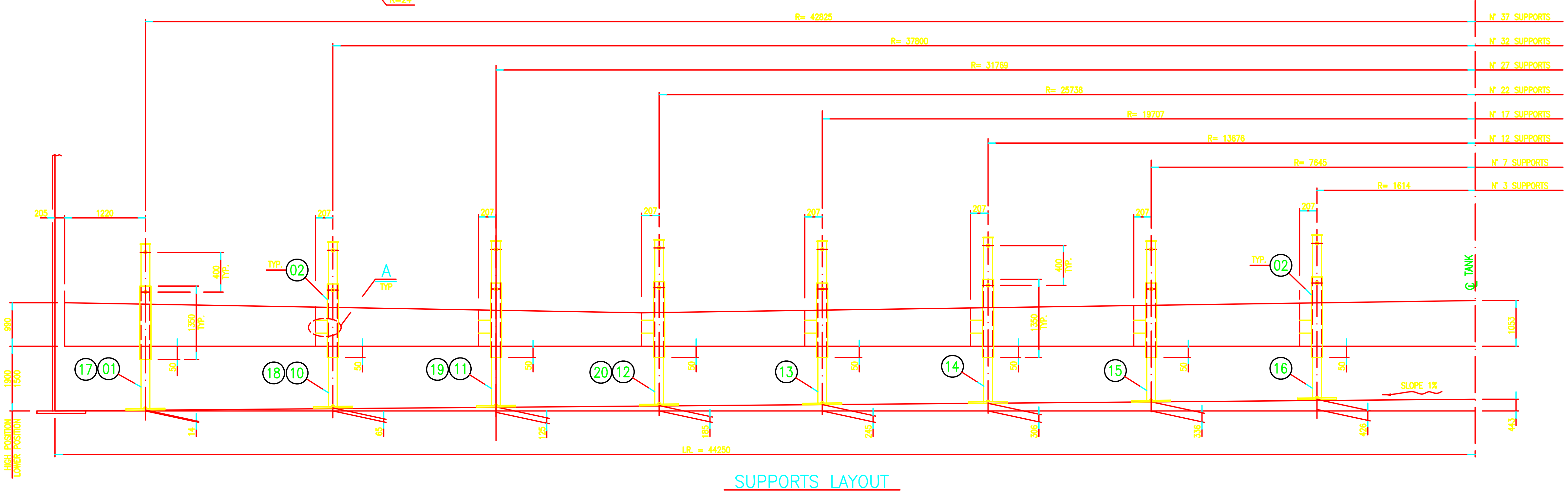


N.34 PIECES

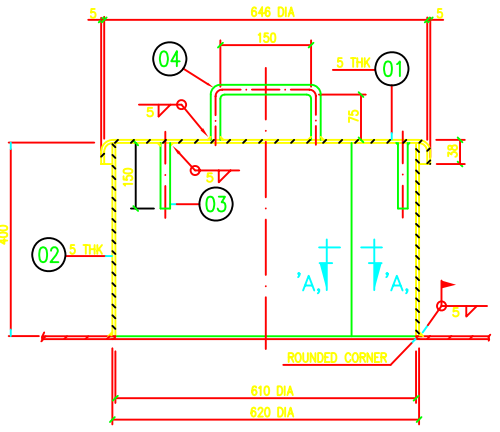
LOCATED IN CORRESPONDANCE OF FLEXIBLE ROOF DRAINS

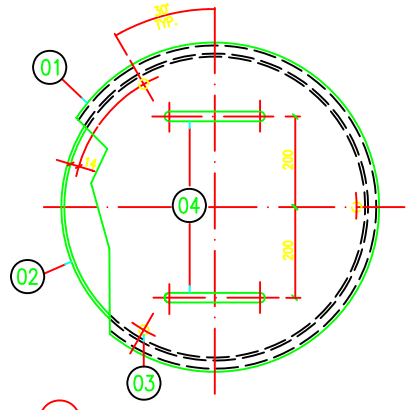
NOTES:

1) FOR ORIENTATION ROOF SUPPORTS SEE DWG N° 2005-118-002.
2) FOR GENERAL ASSEMBLY SEE DWG N° 2005-118-001.
3) ALL WELDS INDICATED WITH ▶ ARE ON SITE WELDS.



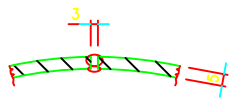
SUPPORTS LAYOUT



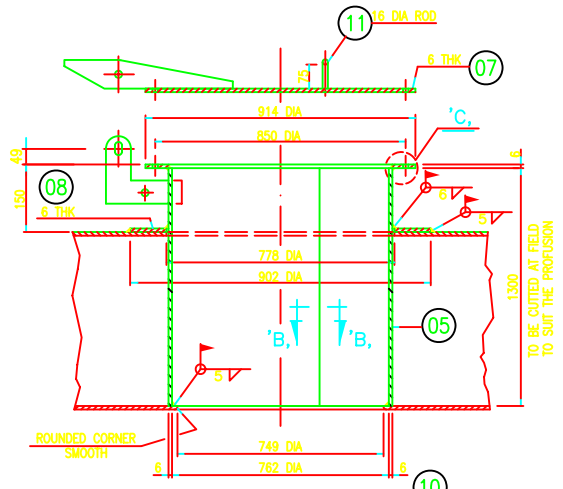


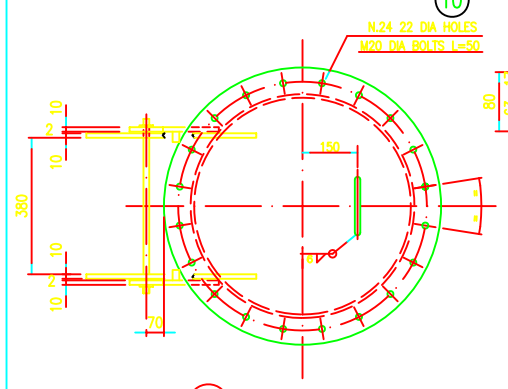
H5 DECK MANHOLE ø24"

REQUIRED N.74 SETS

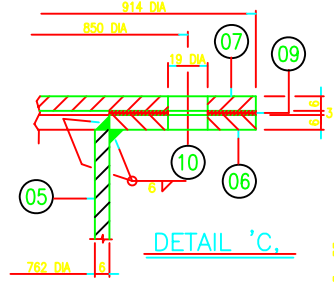


SECTION A–A

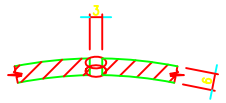




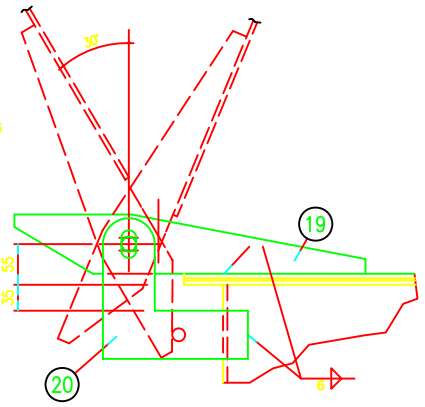
H1 ROOF MANHOLE ø30"



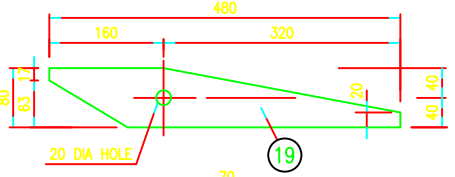
DETAIL 'C'

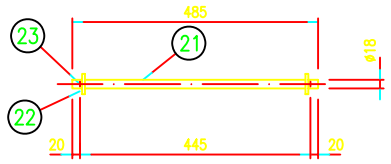


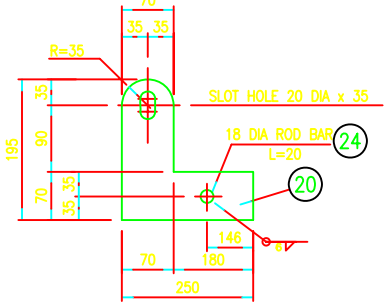
SECTION B–B



HINGE DETAIL





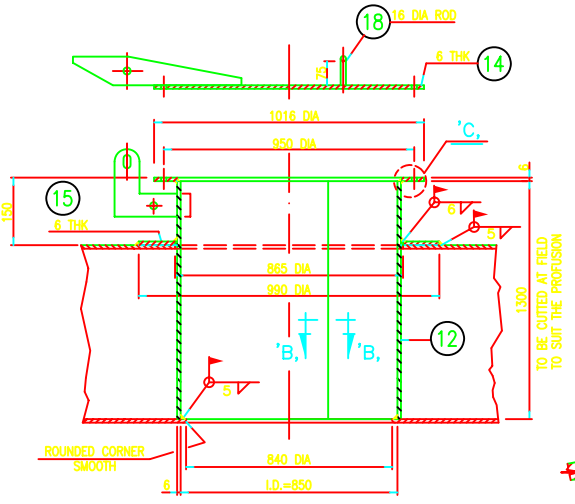


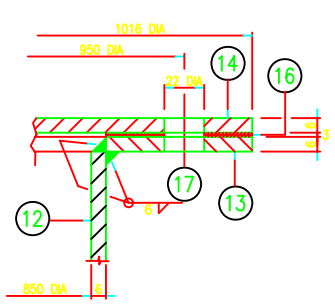
FIELD NOTES:

- WHEN LOCATING MANHOLE CUTOUT IN ROOF OR DECK PLATES, AVOID THREE WAY LAPS.
- ALL SINGLE DECK LAP WELDS WITHIN A 305 mm RADIUS OF THE MANHOLE NECK, SHOULD BE REINFORCED BY INTERMITTENT FILLET WELDS 50mm IN 254mm ON THE UNDERSIDE OF THE DECK.

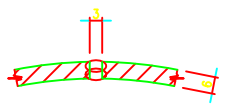
	ITEM	QUANTITY	DESCRIPTION	MATERIAL	UNITARY WEIGHT	TOTAL WEIGHT	NOTE
H5	01	74	SKETCH PLATE 5 THK SEE DWG.	A 283 M Gr.C	16.8	1243.2	
	02	74	PLATE 5 THK 400x1932	A 283 M Gr.C	31.5	2331	
	03	222	16 DIA ROD L= 150	S 235 JR UNI EN 10025	0.3	66.6	
	04	148	16 DIA ROD DEV.=340~	S 235 JR UNI EN 10025	0.5	74	
H1	05	1	PLATE 6 THK 1300x2413	A 283 M Gr.C	151	151	
	06	1	PLATE 6 THK O.D.914 / I.D.774	A 283 M Gr.C	5.2	5.2	
	07	1	PLATE 6 THK 914 DIA	A 283 M Gr.C	30.9	30.9	
	08	1	PLATE 6 THK O.D.902 / I.D.778	A 283 M Gr.C	9.6	9.6	
	09	1+2	GASKET 3 THK O.D.914 / I.D.762	COMPRESSED GLASS FIBER	/	/	ASBESTOS FREE
	10	24+3	BOLT M20 x 50	CL. 8.8	0.28	6.7	GALVANIZED
	11	1	16 DIA ROD DEV.=340~	S 235 JR UNI EN 10025	0.5	0.5	
	19	2	SKETCH PLATE 10 THK	S 235 JR UNI EN 10025	2	4	
	20	2	SKETCH PLATE 10 THK	S 235 JR UNI EN 10025	2.1	4.2	
	21	1	18 DIA ROD L=485	S 235 JR UNI EN 10025	1	1	
	22	2	WASHER 4 THK O.D.35 / I.D.19	S 235 JR UNI EN 10025	0.02	0.04	
	23	2	SPLIT PIN 4 DIA	S 235 JR UNI EN 10025	0.1	0.2	
	24	2	18 DIA ROD L=20	S 235 JR UNI EN 10025	0.05	0.1	
H2	12	1	PLATE 6 THK 1300x2689	A 283 M Gr.C	168	168	
	13	1	PLATE 6 THK O.D.1016 / I.D.862	A 283 M Gr.C	10	10	
	14	1	PLATE 6 THK 1016 DIA	A 283 M Gr.C	39	39	
	15	1	PLATE 6 THK O.D.990 / I.D.865	A 283 M Gr.C	8.7	8.7	
	16	1+2	GASKET 3 THK O.D.1016 / I.D.850	COMPRESSED GLASS FIBER	/	/	ASBESTOS FREE
	17	24+3	BOLT M20 x 50	CL. 8.8	0.3	8	GALVANIZED
	18	1	16 DIA ROD DEV.=340~	S 235 JR UNI EN 10025	0.5	0.5	
	25	2	SKETCH PLATE 10 THK	S 235 JR UNI EN 10025	2	4	
	26	2	SKETCH PLATE 10 THK	S 235 JR UNI EN 10025	2.1	4.2	
	27	1	18 DIA ROD L=565	S 235 JR UNI EN 10025	1.2	1.2	
	28	2	WASHER 4 THK O.D.35 / I.D.19	S 235 JR UNI EN 10025	0.02	0.04	
	29	2	SPLIT PIN 4 DIA	S 235 JR UNI EN 10025	0.1	0.2	
	30	2	18 DIA ROD L=20	S 235 JR UNI EN 10025	0.05	0.1	

TOTAL WEIGHT Kg. 4150

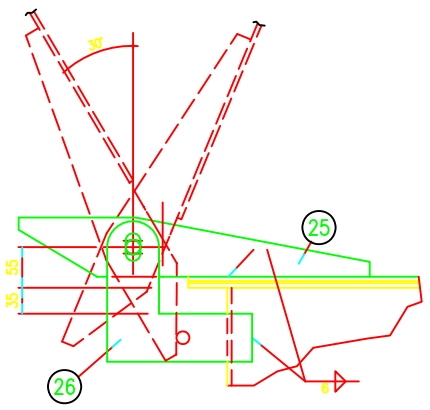




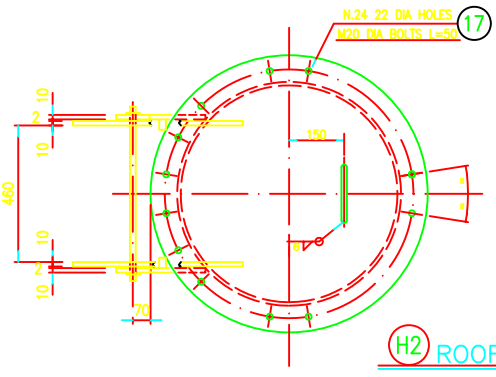
DETAIL 'C'



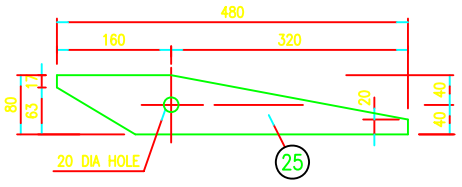
SECTION B–B

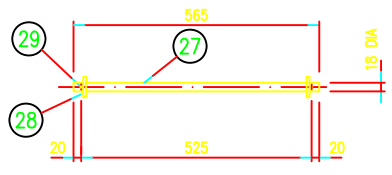


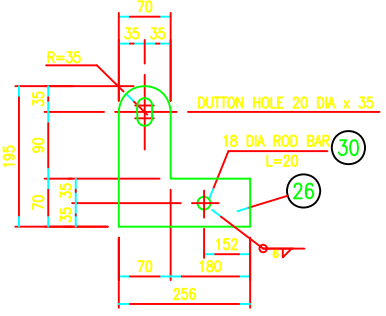
HINGE DETAIL



H2 ROOF MANHOLE ø34"



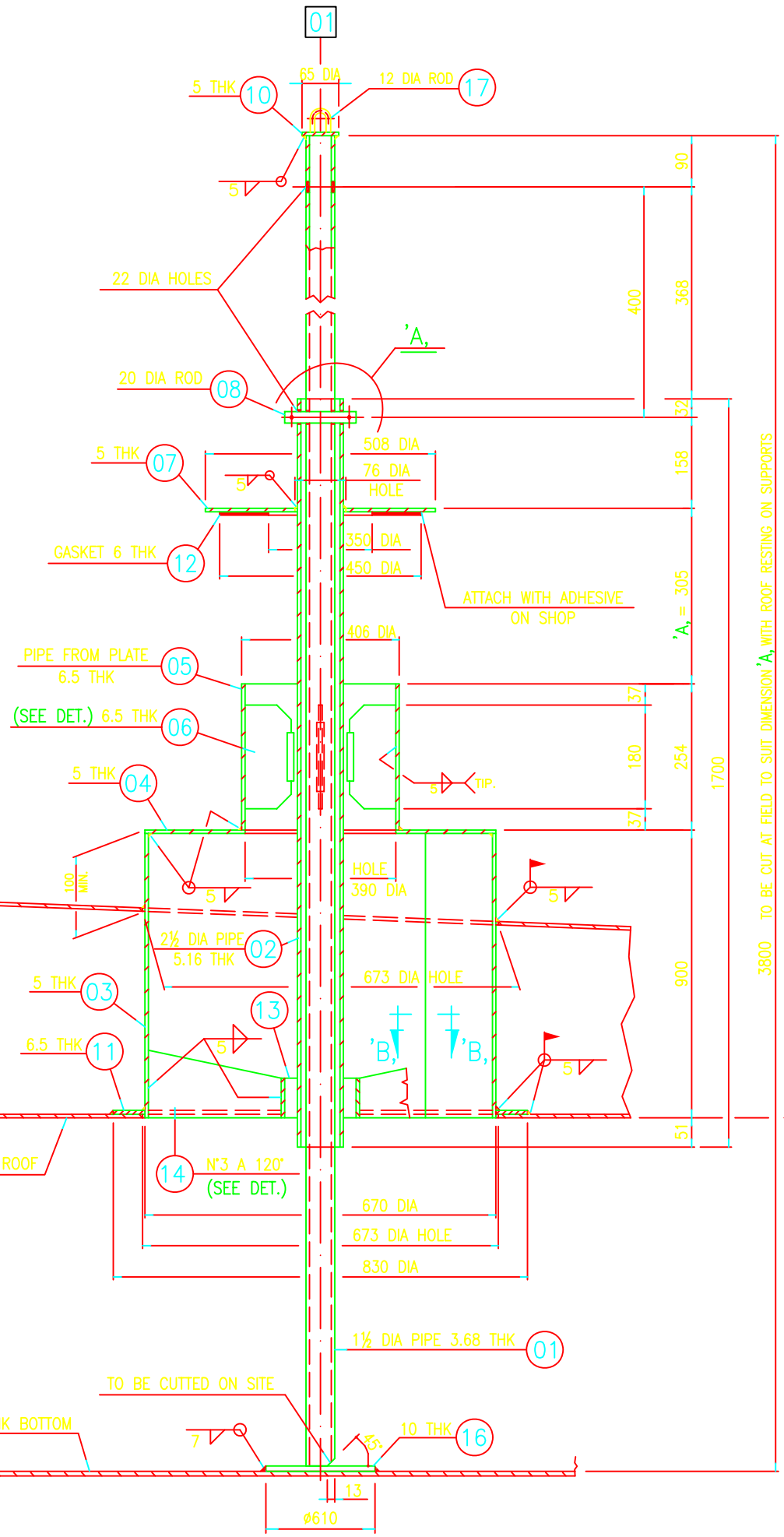


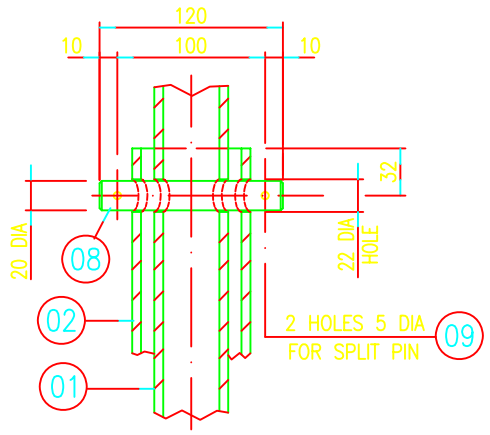


FIELD NOTES:

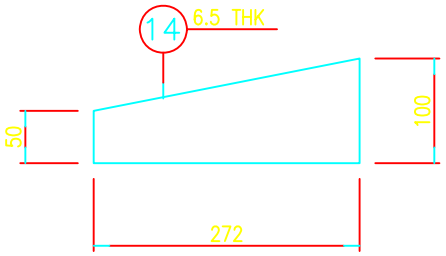
- WHEN LOCATING MANHOLE CUTOUT IN ROOF OR DECK PLATES, AVOID THREE WAY LAPS.
- ALL SINGLE DECK LAP WELDS WITHIN A 305mm RADIUS OF THE MANHOLE NECK, SHOULD BE REINFORCED BY INTERMITTENT FILLET WELDS 50mm IN 254mm ON THE UNDERSIDE OF THE DECK.

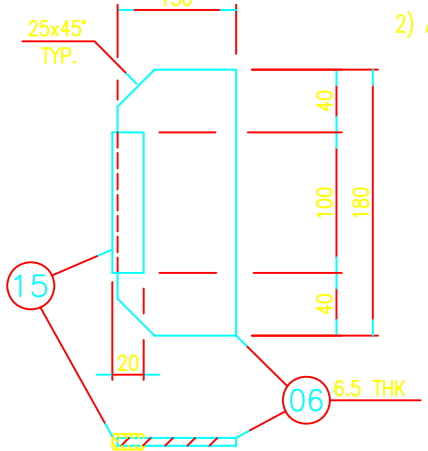
- FOR "GENERAL ASSEMBLY" SEE DWG. N. 2005-118-001
- IF NOT INDICATED ⚑ (FIELD WELD), WELDINGS ARE CARRIED-OUT IN SHOP



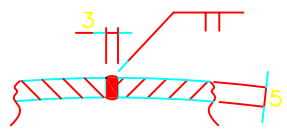


DETAIL 'A,





DETAIL POS. 06 15



SECTION 'B–B,

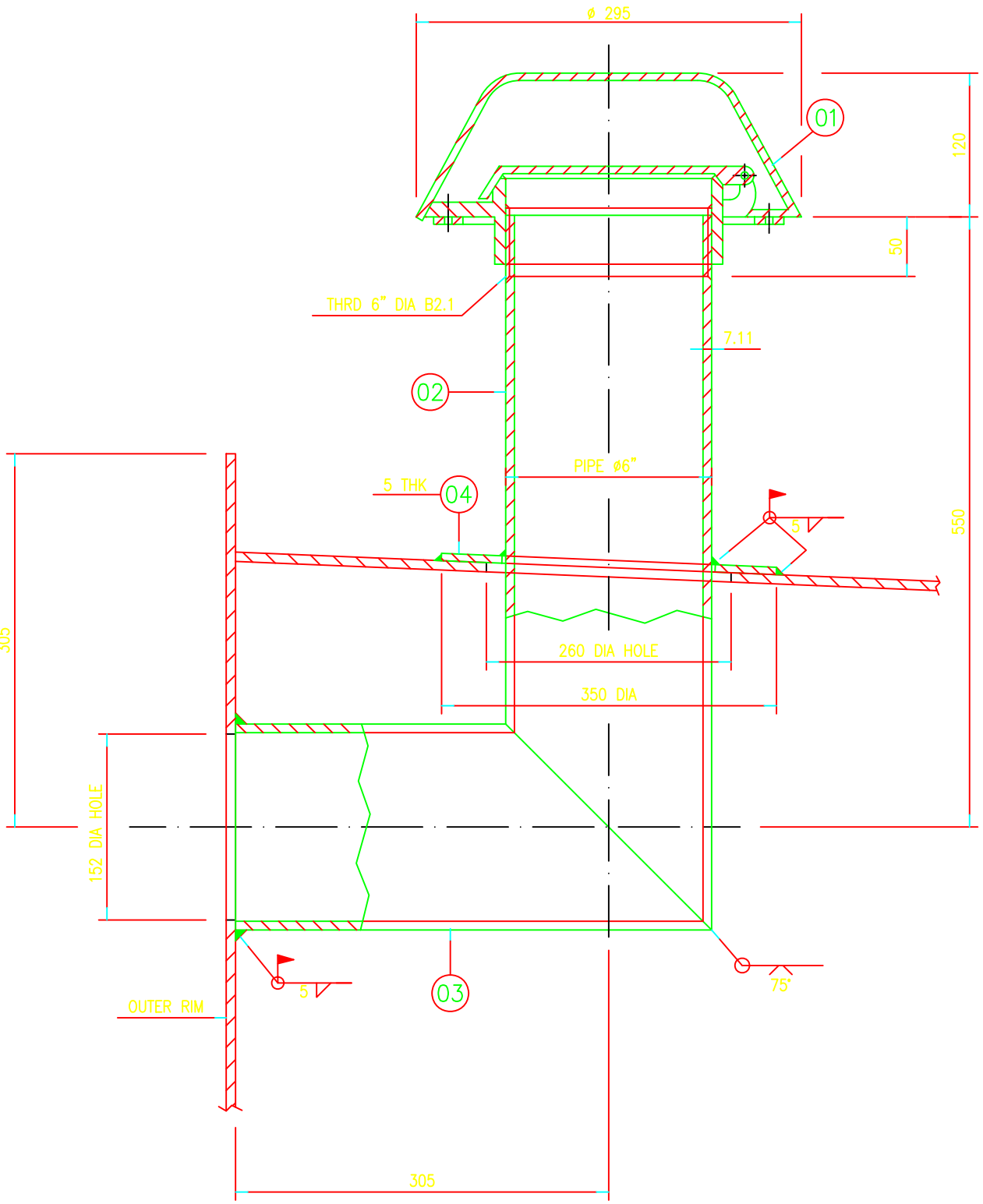
ITEM	QUANTITY	DESCRIPTION	MATERIAL	UNITARY WEIGHT	TOTAL WEIGHT	NOTE
01	1	1½ DIA PIPE 3.68 THK L= 3790	API 5L Gr.B	15.3	15.3	
02	1	2½ DIA PIPE 5.16 THK L= 1700	API 5L Gr.B	14.7	14.7	
03	1	PLATE 5 THK 895 x 2090	A 283 M Gr.380	75	75	
04	1	PLATE 5 THK O.D. 670 I.D. 390	A 283 M Gr.380	9	9	
05	1	PIPE FROM PLATE 6.5 THK 406 DIA L=254	A 283 M Gr.380	16.5	16.5	
06	4	PLATE 6.5 THK 150 x 180	A 283 M Gr.380	4.4	4.4	
07	1	PLATE 5 THK O.D. 508 I.D. 76	A 283 M Gr.380	6	6	
08	1	20 DIA ROD L= 120	S 235 JR UNI EN 10025	0.3	0.3	
09	2	3 DIA SPLIT PIN L= 40	AISI 304	/	/	
10	1	PLATE 5 THK 65 DIA	A 283 M Gr.380	0.15	0.15	
11	1	PLATE 6.5 THK O.D. 830 I.D. 673	A 283 M Gr.380	9.8	9.8	
12	1	GASKET 6 THK O.D. 450 I.D. 350	COMPRESSED GLASS FIBER	/	/	
13	1	4" DIA PIPE 6.02 THK L= 50	API 5L Gr.B	1	1	
14	3	PLATE 6 THK 100 x 272	A 283 M Gr.380	5	5	
15	4	PLATE 3 THK 100 x 50	BRASS	0.15	0.6	
16	1	PLATE 10 THK 610 DIA	A 283 M Gr.380	23.4	23.4	
17	1	12 DIA ROD BAR L =175	A 283 M Gr.380	0.2	0.2	

TOTAL WEIGHT Kg. 181

REQUIRED N.4 SETS

NOTE:

1) FOR GENERAL ASSEMBLY SEE DWG N° 2005-118-001.
2) ALL WELDS INDICATED WITH ⚑ ARE ON SITE WELDS.



ITEM	QUANTITY	DESCRIPTION	MATERIAL	UNITARY WEIGHT	TOTAL WEIGHT	NOTE
01	1	VENT VALVE ø6" NPT	ALUMINIUM	5.5	5.5	TYP. LUPI DWG. 49
02	1	6" DIA PIPE 7.11 THK L= 634	API 5L Gr.B	18	18	
03	1	6" DIA PIPE 7.11 THK L= 389	API 5L Gr.B	11	11	
04	1	PLATE 5 THK O.D. 350/I.D. 171	A 283 M Gr.380	2	2	

TOTAL WEIGHT Kg. 37

REQUIRED N.2 SETS

NOTES :

1) ALL WELDS INDICATED WITH ⚑ ARE ON SITE WELDS.

2) FOR "GENERAL ASSEMBLY" SEE DWG. N. 2005-118-001